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INDEX TO CONTENTS, PAGE 288.

ADVERTISERS' INDEX, PAGE 26.

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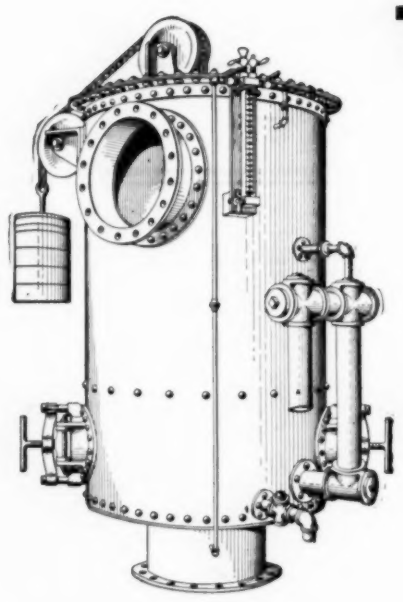

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VOL. CII., No. 18. NEW YORK, MAY 3, 1915. WHOLE No. 2,082

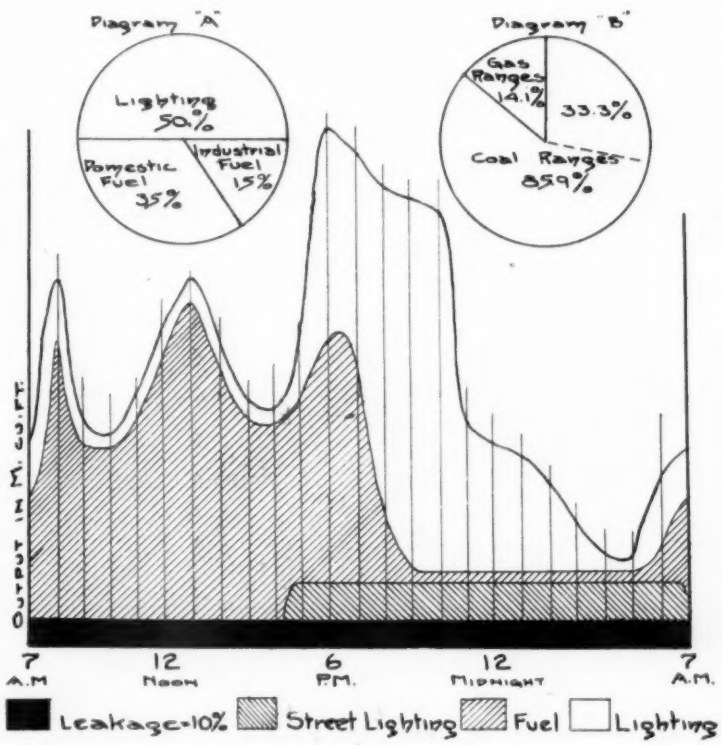
PRESIDENT DUTTON'S ADDRESS TO THE PENNSYLVANIA GAS ASSOCIATION.

Each annual meeting is an occasion when we approach a new cross-road in our progress—we pause and consider in retrospect the events that have engaged our attention the 12 months previous. By the mutual exchange of experiences we are enabled to readjust our bearings, if need be, and select the pointer board that will guide us to the road to renewed confidence.

To have been selected as the president of this Association is an expression of your confidence and good will that has had my sincere appreciation. There came with it a responsibility which I hesitated to assume because I felt unequal to the opportunity for service that it provided. Because of your promise to share the responsibility I was finally lead to accept the office, and it is a pleasure to acknowledge the hearty and loyal support of those who have prepared the papers and provided the entertainment for these sessions.

The custom of having a President's Address has not become "regular"—and it is not with the thought of presenting anything new or worth while that such attempt is made, but rather that it would seem to be a courtesy due the members, that the one whom they honor by presenting the opportunity to observe some of the matters engaging the attention of the leaders in the gas industry, should become the "mental clothes pole" upon whom they suspend their thoughts for a little while.

Convention Keynotes.— The recent general environment of industry has been similar to our other businesses that have been either "marking time" or retreating instead of "marching on," and we believe our Committee has wisely announced that the keys to which our meetings will be attuned are *optimism* and *accomplishment*—these are the notes we aim to strike to set a new high-water mark in our already eventful history.



Division of a Winter Day Sent Out.

Finances.—Your attention has already been directed to the prosperous condition of our Treasury with a balance of over $1,200. We find ourselves in better financial condition that we could have conceived possible, and are equipped to carry on a larger work without the handicap we have heretofore had.

Joint Meeting.—A departure from our usual custom is our invitation to the New Jersey Gas Association to meet with us, and they have graciously accepted. Their presence encourages more fraternal relations with organizations having a similar object. An invitation to the Directors of the American Gas Institute, with which we are affiliated, to hold their monthly meeting co-incident with our sessions was accepted by them, and some of them will encourage us by their presence. The Chairman of the Reciprocal Relations Committee of the National Commercial Gas Association advised us of their desire to co-operate for the success of our meetings, and because of the helpful relationship already established through the Booklet Committee, we responded by arranging for the presence of some of their Officers and Directors, and providing exhibition space for the Gas Equipment Booklets and the educational work of that Association. These features are deserving of our hearty support.

Affiliation.—The generous response of the various gas associations to our invitations to reciprocate in this way, is an expression of the continued and increasing belief that much association work is similar and should be co-ordinated—and our financial resources conserved through *one* organization that would truly represent the Gas Industry. There are double the number of State and District Gas Associations to-day that were in existence when several State and District organizations met in the GAS CONGRESS 10 years ago, which resulted in the formation of the American Gas Institute. Although our Association has been affiliated with the Gas Institute for 3 years, it has been of no real service to either until the past year, when the Public Relations Committee of the Institute was able to give us assistance when such service was needed. As your representative, I have taken my place on its Board of Directors, and have been cordially received and selected to serve on two Committees—"Revision of By-laws" and "Affiliation." It is recognized that there is need for a more workable and inviting plan of affiliation, and that Committee has recommended a modification of the Agreement with the Institute, and proposed changes in the Constitution to meet the new condition. This report has already been presented to you for consideration at the morning session.

Gas Congress.—The attention of our members is directed to the INTERNATIONAL GAS CONGRESS in San Francisco, September 27th to October 3rd, in which practically all the American gas associations and many associations from foreign countries will participate. We should have not only an official representative but many members present on that occasion. A full report of the progress of the

TABLE NO. 1.

Town No.	Yearly Sales, Millions.	Consumers.	Yearly Sales per Consumer.	Total Ranges.	Per Cent. of Consumers.	Total Water Heaters.	Per Cent. of Consumers.	Miles, Mains.	Consumers Per Mile.	
*1	240	6,500	35-M	5,000	77	2,300	35	156	42	...
2	530	19,000	29-M	12,000	63	2,500	13	238	80	...
3	141	6,020	24-M	4,700	78	800	13	140	43	...
*4	113	6,080	19-M	4,600	76	1,300	21	36	169	...
*5	200	9,200	22-M	8,000	87	2,500	27	53	174	...
*6	175	12;000	15-M	7,000	60	2,000	16	66	182	...
*7	100	5,000	20-M	2,800	56	200	4	40	125	...
8	150	9,000	17-M	7,200	80	750	8	70	129	...
*9	355	20,000	18-M	10,000	50	2,300	11	110	182	...
*10	144	9,000	16-M	6,700	74	400	4	70	128	...
11	340	16,000	18-M	13,000	72	1,650	9	131	137	...
*12	200	10,000	20-M	3,800	38	900	9	64	149	...
13	105	7,000	15-M	6,200	89	850	12	56	125	...
*14	150	7,600	20-M	3,000	40	1,000	13	63	120	...

TABLE NO. 2.

Town No.	Yearly Sales, Millions.	Consumers.	Yearly Sales per Consumer.	Total Ranges.	Per Cent. of Consumers.	Total Water Heaters.	Per Cent. of Consumers.	Miles, Mains.	Consumers Per Mile.	B. T. U.
1	30	2,500	12-M	1,000	40	....	....	20	125	600
2	32	1,800	18-M	700	41	185	10	18	100	600
3	50	3,000	17-M	1,600	53	450	15	30	100	...
4	16	1,200	13-M	600	50	75	6	12	100	625
*5	28	2,000	14-M	1,600	80	400	20	16	125	600
*6	24	1,300	18-M	675	67	125	9	10	130	...
7	28	1,500	19-M	1,000	67	300	20	15	100	...
8	25	2,000	13-M	742	37	200	10	18	111	600
9	26	1,600	16-M	1,125	70	200	12	22	72	600
10	16	1,200	13-M	665	55	166	14	8	150	700
*11	45	2,400	19-M	1,500	62	300	13	22	109	640
*12	27	1,500	18-M	1,425	95	250	17	15	100	620
13	27	1,800	15-M	1,500	83	250	14	13	138	650
14	65	4,500	14-M	2,750	61	250	5	63	66	600

preparations for this event will be made at another time during our meetings.

Gas Rates.—During the past two years 12 papers have been presented by individuals and committees who have given close study to the question of gas rates, and much valuable information has been furnished. More study and analysis of conditions is desirable, and we have been requested to join the movement started by other State associations, by appointing a committee to devote further study to the subject and to have authority to co-operate with similar committees of other associations and reach some conclusions and recommendations on the subject.

This is a matter of prime importance in view of the questions arising before various State Commissions, and although we have had no need for information of this character, a standing committee might wisely be appointed to collect data available and place it at the disposal of members who may need it.

Gas Main and Service Welding.—This is a matter that may profitably be studied and the method adopted. It was in our State that the original work was done by Mr. J. D. Shattuck, at Chester, Pa., in April, 1911, and we are fortunate in being able to have a practical demonstration by the courtesy of Mr. Shattuck during these sessions.

The production of a leakless gas main is one of the economies that has been the dream and hope of the gas engineer, and this deferred hope is now being consumated.

Gas Equipment Booklet and Piping Schedule.—One idea harnessed and put to work was that of preparing and distributing a booklet giving desirable information to architects, builders and plumbers. It should be noted that a dozen of these booklets properly distributed are worth one thousand on the shelf awaiting shipping directions. The work of the committee that prepared this booklet can be enhanced and gas companies benefitted if the Association will voice its final adoption of the schedule of sizes of piping, and the members employ a system of inspection of new buildings to see that the standard is followed.

So much for observations on matters of general interest.

Now let us rest our sense of hearing by applying that of seeing also, as we put to the test the old adage, "Seeing is believing."

The most enduring part of these sessions, and because enduring they will be the most profitable, will be those things that have started a train of thought that leads to the birth of a new idea, which will be put to work on our return home.

The tables and diagrams we have placed before you will now become the mirror in which you look to see reflected the varying response to the efforts in your field of labor. It is a law of the harvest that we reap more than we sow—this is exemplified by the response of nature in producing two blades of grass where only one grew before. It's the same soil, but one man tickled it with the hoe in a different way and used the fertilizer the soil needed.

The comparative figures on Table No. 1 were obtained from the 1914 Brown's Directory, being figures furnished for publication, and supposedly nearly correct. Fourteen Pennsylvania companies are compared (using numbers instead of names) whose sales are over 100 million cubic feet per year. Table No. 2 gives the same data for companies selling from 15 to 65 million cubic feet per year, located in the smaller towns of our State. Those marked with a star are known to have considerable industrial business, and while this designation may not be absolutely correct, it will assist by illustration to demonstrate the average annual sales per consumer, and the per centage relation of gas ranges and water heaters in use to the total number of consumers.

Diagram "A" is a reproduction of a chart published by a company manufacturing gas arc lamps, and is stated by them to be the average per centage relation of sales of gas in this country for lighting, domestic and industrial fuel purposes.

The curve shown is that of a 24-hour output in a winter month, giving the variation of the various demands of this company's consumers, and the hatchings show the output separated into leakage, lighting sales and domestic and industrial gas sales. Unfortunately a record was not available to plot a similar curve for a summer month and the year's average, which would establish a curve showing that the diagram of 50% lighting business is not overdrawn. The diagram should not *mis*lead us to believe that our lighting business is decreasing, but rather that our other business is increasing more rapidly.

Diagram "B" is a reproduction of an illustation in the report of the Committee on Domestic Fuel Appliances to the N. C. G. A, Convention, 1914. It shows the sales of coal ranges and gas ranges in 13 years prior to 1913, and is useful only to demonstrate the percentage relation of the sales of the two classes of stoves. I do not understand that the coal range figures are confined to areas supplied with gas mains, but if only 33⅓% of the total were thus located, these added to the gas ranges to be renewed within five years, would indicate the prospective sale for new gas ranges, and should produce an optimistic view of this department of our industry.

We should emphasize that every gas range renewed will produce a considerable profit instead of possibly a loss entailed by the original installation because it may have included a free fuel line. This is a profitable part of our merchandising business that will partially off-set the cost of free maintenance of lamps, to those who have the courage to inaugurate it.

These reflections on the existing conditions of our business might be further illustrated, but time will not permit, and we will consider some more intimate relations for a moment.

Homely illustrations may sometimes carry home the lessons we want to learn in the great school of life. Some one has said all men are much alike in their lower nature; it is in their higher nature that they differ. This has also been expressed in the fact that men present a very similar appearance from their chins to the ground, but from the chin to the part in their hair there is a vast difference. Surely the capacity of men differs when their ability is measured at this higher level.

Some of us may not have the proper relative value of the essential factors for the proper development of our business clearly outlined in our own mind. Our ideas may be as much out of proportion as exemplified by the use of chips by two men, one carries them on his shoulder and the other burns them under the boiler.

Henry L. Doherty in his paper before the Gas Congress, 1904, on "Gas Association Work," gave a comprehensive view of the essential factors in the gas business, and it is worthy of repetition. He said:

"There is a difference between the gas business and almost any other business that cannot be readily understood, but recognition of this distinction will possibly be sufficient to cause the difference between success and failure. The business is complicated in character and peculiar in itself. For convenience the following divisions may be made:

It is a manufacturing business,
it is a transportation business,
it is a collection business,
it is an investment business,
it is a mercantile business,
it's successful conduct requires that it should be a development business.

"There is one great distinction that should always be kept in mind. In almost any other business the owners or directors limit the demands made on it, while the maximum demand for the supply of gas is absolutely within the hands of the consumer, and we must anticipate and furnish the necessary investment to provide for the demand which the consumer may place upon us."

With this view of our business we will be better able to apply ourselves to making the wheels go round. The builder of the Ferris wheel used the leverage principle by applying a small quantity of power to the circumference of the wheel to make it revolve, instead of a greater amount at the axle or hub in the center.

"Successes to-day are mostly among men who are thinking and developing the mind like breaking a path through a virgin forest; paths are first made where necessity calls, they are then beaten by the feet of those who follow and soon become the highways of the nation."

When an economy, an improvement, a decrease in friction, or a suggestion for other advancements are made and proven, each increases the confidence and growth of the individual through the knowledge of his own increased power.

In the business game to-day there are two "duces" that are always trumps—Reduce, Produce. The fellow that holds these will always take the important tricks. As an example of this, suppose we can make an economy of $1.50 per day by reducing our expenses by dispensing with a laborer who is non-productive, or by some other operating economy. If we saturate that $1.50 per day with energy and put it to work in the service of capital instead of the service of unprofitable labor, it will *produce* as follows: $1.50 per day, minus Sundays and holidays, means $450 per year, which would pay 5% interest on $9,000 capital. That amount of capital will furnish two miles of gas mains and meters and service connections for 200 consumers. If these consumers are equal to the average they will produce a gross income of $4,000 per year.

In closing, I want to suggest three things to keep in mind that some one has said we should obtain from our business. Call them "3 p's in a pod."

Profit — Permanence — Pride.

Without profit it isn't a business, it's only a hobby,
without permanence only an existence,
without pride our labor is only a drudgery.

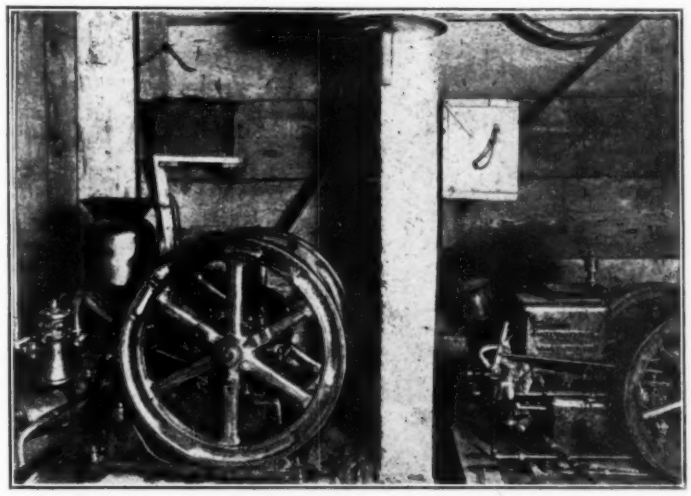
From our few days together of social, mental and physical relaxation, I hope we may gain an inspiration that will be a source of enthusiasm and interest in our work, in fact get a vision of our benefit to humanity. When we return to our fields of labor and view again the dirty retorts and generators and the old red or black gas holder, we should let our imagination picture the contrasting scene of the cheer radiated in the groups of homes where our gas spreads its ray of light, as "Old Sol" draws the curtain and lays himself down to rest! We should picture the day when our consumers will stop us on the street and thank us for splitting the kindling, shoveling the coal and screening the ashes and delivering the fuel to the housewife to enable her to prepare the meals in comfort and ease. Then recall how pleased we are to look upon a flock of spring "broilers" who awoke in the incubator to find their mother was a Welsbach gas lamp! As we realize the comfort and safety produced by the application of our fuel to the industrial problems we will some day hope to meet the tired laborer who will thank us for our energy in his behalf.

These visions—not unreal—should stimulate an "optimism" that will carry us on to greater "*accomplishment*" in the days ahead!

The Immediate Gas Engine Business.[1]

[Paper read by H. W. EDMUND before the Illinois Gas Association.]

A preliminary survey of territory with the object of obtaining gas engine prospects will disclose two main classes of business. First, plants that have as prime mover some type other than an internal combustion engine; and second, plants that have internal combustion engines but not using gas as fuel. It is the object of this paper to emphasize the latter class, and to bring out the importance of operating with gas every engine in use on or near our mains. New installations are desirable but it is essential to first obtain the present engine business.



3-Horse Power Gas Engine and Gasoline Engine it Displaced.
Load—One 6-unit Hinman Milking Outfit.

Of the fuels with which we are competing, gasoline is the most important; kerosene and distallate are cheaper fuels, but in spite of the engine manufacturers' assertions to the contrary, the attendant difficulties of operation more than offset the decreased cost. The price of gasoline to the consumer has varied during the last 4 years from 10 cents per gallon to a maximum of 18 cents. Taking the average engine guarantee of 12,000 B. T. U. per brake horsepower per hour, equivalent to 20 cubic feet of 600 B. T. U' gas, or one pint of gasoline, we have compiled a table of comparative fuel costs per brake horsepower per hour. (Fig. I.) This shows 90-cent gas equivalent to 14½-cent gasoline; and, to meet 11-cent gasoline; gas must be sold at 65 cents per 1,000. However, the gasoline purchased according to the invoices usually exceeds the quantity consumed in the engine, the loss due to careless handling, evaporation and inferior quality of gasoline. Allowing this difference to be 10% we have 90-cent gas competing with 13½-cent gasoline.

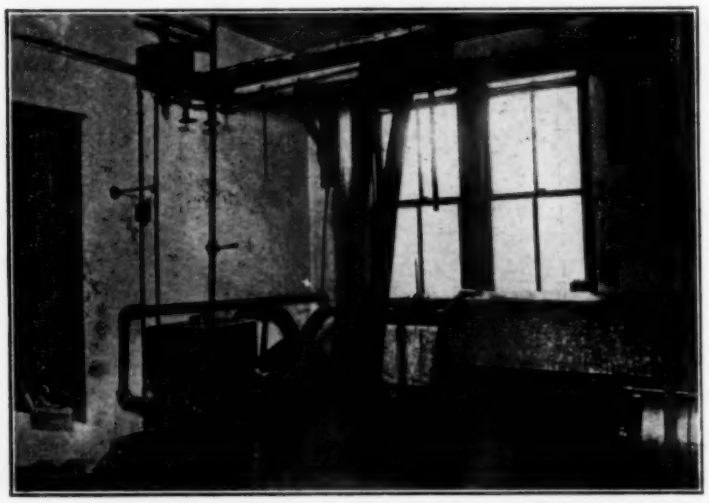
Gasoline Price Per Gal.	Cost of Gasoline Per B H P. Hour	Cost of gas per B. H. P. hour. 1.10	1.05	1.00	.95	.90	.85	.80	.75	.70	.65	.60
.10	.0125											.012
.10½	.0131										.013	
.11	.0137											
.11½	.0143									.014		
.12	.0150								.015			
.12½	.0156											
.13	.0162							.016				
.13½	.0168											
.14	.0175						.017					
.14½	.0181					.018						
.15	.0187											
.15½	.0193				.019							
.16	.0200			.020								
.16½	.0206											
.17	.0212		.021									
.17½	.0218											
.18	.0225	.022										

Fig. 1.—Comparative Fuel Costs.

1 Slightly abridged.—EDS.

Fortunately fuel cost is not the only item to be considered. At times we can not prove, even to our own satisfaction, that gas is less expensive than gasoline. Engine users whose gas consumption averages less than 28,000 cubic feet per month pay the domestic rate, 90 cents, as our industrial rate specifies a minimum charge of $25.00 per month and a contract for one year.

The present cost of gasoline is 11 cents, and our own figures show it is four-tenths of a cent per brake horsepower per hour cheaper than gas at 90 cents. How do we overcome this difference? By a 30 days' trial under the owner's supervision. Usually we are able to run the engine more efficiently than its regular attendant, and in doing so the slight increase in fuel cost is absorbed. It is difficult to have the engine owner appreciate the convenience of gas in dollars and cents without a trial, but at the end of that period he is likely to give more weight to the convenience of gas than to the saving in fuel cost.



10-Horse Power Engine. Load—Laundry Machinery.

Before the engine is equipped for gas determine its mechanical condition. It is poor policy to change the fuel unless the engine is in good shape as the new fuel will invariably be blamed for any increased cost. If the engine is in good mechanical condition, or will be put in good condition, the first thing to determine is the present cost of gasoline per brake horsepower per hour. This may be done by going over gasoline bills for a certain period and obtaining the number of hours run, from the owner. The load may be secured by using a Prony brake or, in case the engine drives an electric generator, by readings of the amperage and voltage. For units over 10-horse power it is well to use an indicator and obtain the actual fuel consumption per indicated horse power hour. It is not advisable to indicate the smaller units, because it is difficult to set the indicator and to obtain the piston motion. Few engines are tapped for an indicator, and manufacturers should provide for setting up an indicator on all engines of over 10-horse power.

Poor compression or ignition should be corrected. If new piston rings do not stop compression leaks, the cylinder should be rebored and a complete new piston obtained. The ignition system should be tried out thoroughly and a good spark secured. When the engine is at its best mechanical efficiency, and pulling a load not exceeding its rating, a gas mixer may be installed. It has been our experience that the average engine maker has not given the designing of gas mixers serious thought. They furnish such an appliance, but the demand for them is so small in comparison with the demand for gasoline and kerosene parts that often the engine operates but poorly with its gas equipment. Our procedure is to try the mixer furnished by the engine manufacturer, and if the engine does not show proper fuel economy we install our own make. The mixer we developed is made of standard fittings and a poppet valve. It is rather crude, but operates satisfactorily engines from 3 to 6 horse power. Compression plates are not used unless engine is operated well up to its rated load. We keep the former mixer parts intact, and if the owner is not entirely satisfied he can have the engine returned to its original condition.

Another piece of apparatus that we have developed is a gasometer or pulsometer, shown in Fig. 2 It consists of a galanized iron box containing a chamber with a meter diaphragm in one end. The diaphragm is extended by the gas pressure but is held in partial check by a spring under tension. The portion of the box not exposed to gas is vented so that it will be under atmospheric pressure. This apparatus is inexpensive, has long life and few moving parts. We have tested it by operating a light on the engine run, and find it prevents any flickering.

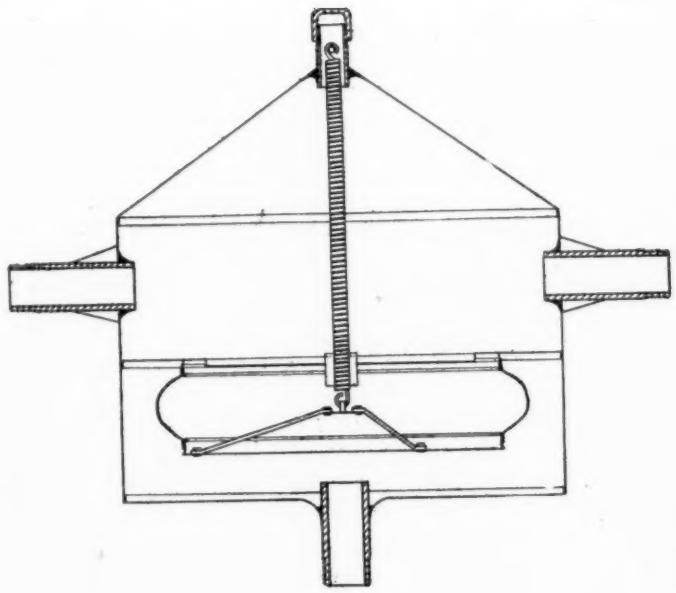
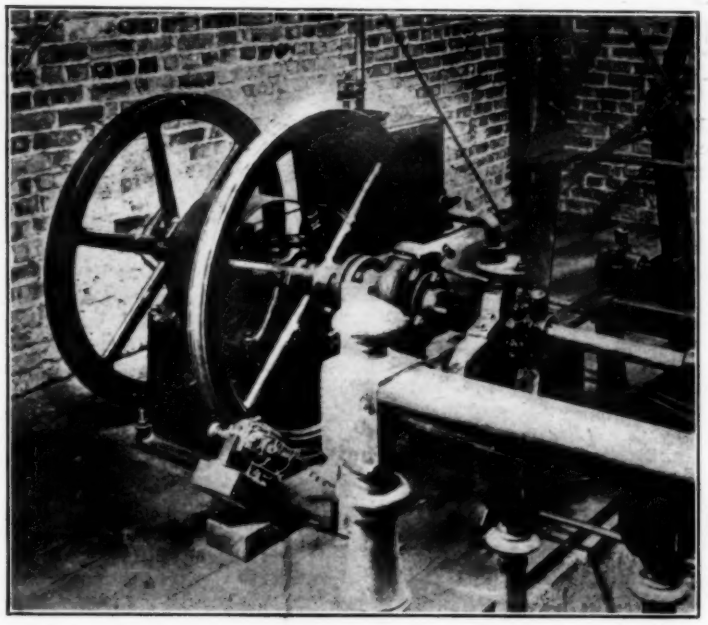


Fig. 2.—Anti-Fluctuator.

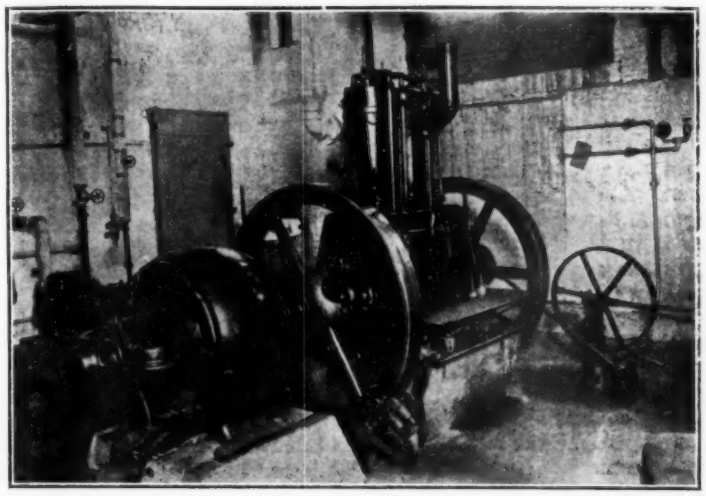


6-Horse power Engine. Load—50 Gallon-per-Minute Deep Well Pump.

It may be interesting to tell the results secured by following the policy outlined. At first we took on engines of any size, no matter how small. We soon found, however, that with engines smaller than 3-horse power the complaint work cost too much in proportion to the revenue, and we therefore limited ourselves to 3-horse power, except where the engine owner is capable of keeping his engine in good mechanical condition himself. The total number of engines connected is 70; total of horsepower, 726; average size, 10.37-horse power; gas consumption, 4,500,000 for the year 1914. We secured this business as follows:

Up to and including 1910....	7	engines
1911....	5	"
1912....	4	"
1913....	31	"
1914....	23	"

In two instances we were unable to secure the business after the run on trial. One of these was a 50-horse power engine operating a small grain elevator. The load was intermittent, depending upon the amount of feed ground, and the owner wished we should show a saving in fuel cost during the trial period. The manufacturer could not furnish a gas mixer and we had to make one. We



25-Horse Power Engine. Load—Electric Generator.

used a poppet valve that had been used on a smaller engine, and succeeded in running the engine with this arrangement, but the load was too large for the mixer, and the poppet broke. A similar mixer of larger size could not be procured so we took another type from a junked engine. This mixer was not a success and by that time the engine owner was impatient. In addition to this the price of gasoline had dropped from 15 to 11 cents, eliminating the apparent saving in fuel. We put the engine in its original condition and have an understanding that we may make another trial when we get a more reliable mixer. It is apparent that this mixer must be of our own design and manufacture, and we intend to make a standard mixer that can be used on engines from 30 to 50-horse power.

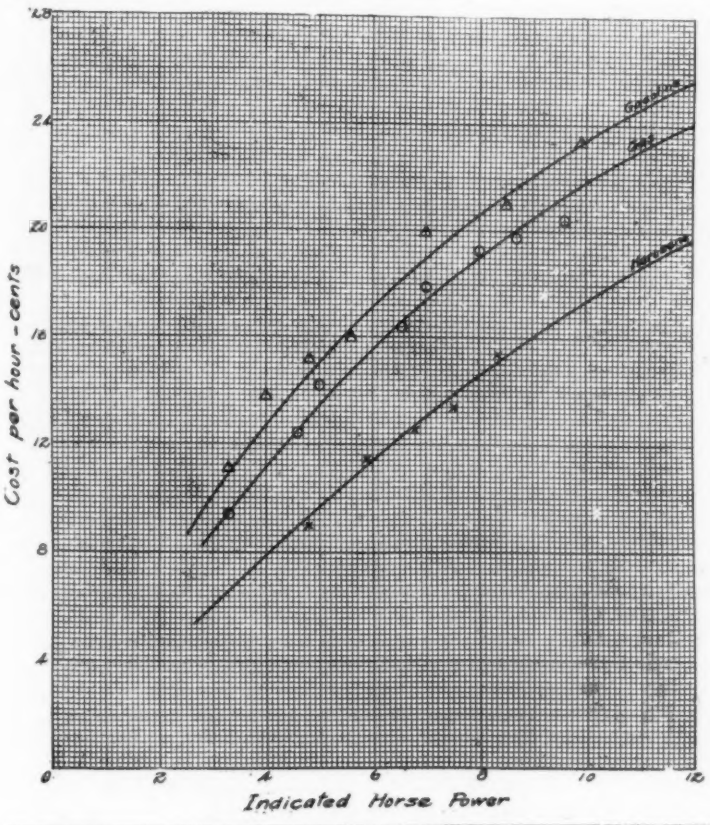
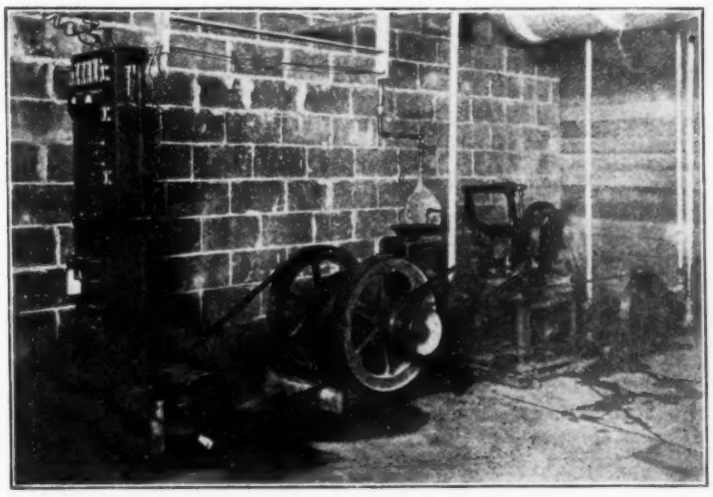


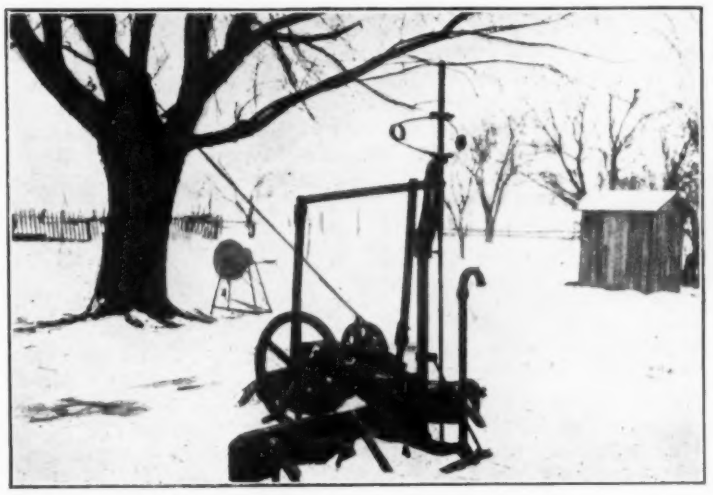
Fig. 3.—Comparison of 3 Fuels.

Our second partial failure was a 20-horse power engine. We made a very careful test, first on gasoline, then gas, and finally kerosene. The results are shown by the curves. (Fig. 3.) Kerosene competition was not expected, but as a special kerosene mixer was purchased while we still had our indicator connected we gladly ran a test with kerosene. The results showed that kerosene was cheapest as a fuel, gas next and gasoline more expensive. Kerosene, however, was barred on account of the smoke nuisance and the difficulty in starting. During the test period the load in the shop increased very rapidly owing to the amount of spring business. The cards proved to our satisfaction that gas was more economical than gasoline, but did not prove it to the engine owner, because the average fuel cost during the months gasoline was used was cheaper than the month when gas was used. The increase in business was permanent so we did not have opportunity to revert to conditions in force when gasoline was used. The best we were able to do was a compromise; they use about half gas and half gasoline. Our part amounts to $20 a month. Sooner or later we are sure to get the entire business.



4-Horse Power Engine. Load—Electric Generator and Two Pumps.

To the trial period, our best selling agent, we leave the task of convincing an engine owner as to the convenience of gas fuel. It demonstrates to him that gas fuel is delivered to his engine and the supply is always ready. He learns that his engine starts more easily on gas than gasoline; his common sense tells him there is less fire risk with gas; he sees that the engine works more quietly and with less jar and vibration. Each of these is so apparent that he does not consider fuel cost the one essential point.



1½-Horse Power Engine. Load—Pump. Takes the place of a windmill.

One interesting class of work that will appeal to all companies having high pressure lines through rural sections is that of the farm. A modern farm has at least one engine in operation and oftentimes two; one used for pumping, the other, a larger engine, from 6 to 20 horse power, used for grinding feed, filling silos, etc. Farmers are good engine customers, as they are used to being independent of the repair man, and keep the engine in good running condition themselves. They appreciate especially the advantage of doing away with the uncertainty of oil supply and the ease in starting in cold weather. We regard this field as of great promise.

It is of decided advantage to co-operate with engine dealers and agents, and to equip engines on their display floors with gas mixers. Several of our new installations could not have been obtained without the dealer's aid.

The cuts are of engines operating under various conditions.

The Pennsylvania Show.

The Manufacturers' Exhibits at the meeting of the Pennsylvania Gas Association, were in the South Roof Garden, and the arrangement of the two dozen exhibits in the limited space available showed that even a small show can be made interesting. Spaces of about 50 square feet mere marked out in chalk, all spaces the same size and each exhibitor having one space. Those represented were:

Welsbach Company.—The "C-E-Z" light, the No. 4276 and the No. 48 lights with kinetic burners were featured, and other Welsbach specialties were shown. Those representing the company were R. J. Rolston, H. H. Richman, C. W. Waddell, George Altemus, Alphonso Mason, B. K. Johnson, Robert F. Pierce, Howard Lyon, F. N. Hamerstrom S. Fees and J. R. Stetser.

Roberts & Mander Stove Co.—The Quality range exhibited had glass oven door, thermometer and enameled door panals, enameled drip and boiling pans. In charge of the exhibit were Stanley Grady, Harry P. Dains, J. Warren Guise and C. V. Roberts, Vice-President of the company.

Iron Hydroxide Co.—This exhibit included samples of iron hydroxide sponge, powered synthetic oxide and synthetic oxide mixed with shavings.

Nightingale Co.—The Ricketts portable incenerator for the average sized home was shown. It is so constructed that the flame impinges directly on the refuse and not on the grates; and it is stated that the burner cannot become clogged or the flame smothered by a mass of refuse. The exhibit was in charge of J. B. Ricketts and J. C. Rickets.

Cyrus Borgner Co.—Refractory materials; arc and jamb-blocks, tiles, sections of clay retorts and various fire-clay specialties for industrial gas furnaces were exhibited, in charge of William C. Gerhard.

Baltimore Gas Appliance and Mfg. Co.—This company exhibited an Oriole gas range, and its features were explained by G. W. Crawford.

John J. Griffen & Co.—Three stock 5-light gas meters composed the exhibit of this company.

Isaac A. Sheppard & Co.—This company exhibited the Imperial Excelsior gas range, its features explained by representatives Howard Plucker and John McKnight.

Pittsburgh Water Heater Co.—The 1915 models of this line, including automatic bungalow heater and a Lion tank heater, were shown. The casing was removed from several of the water heaters to show the interior construction. The exhibit was in charge of District Sales Manager W. H. Saam.

Hale & Kilburn—The All Sheet Steel gas range made by this company has an interchangeable feature, by which it may be converted in ahout 15 minutes from a cabinet to a double oven range and a sanitary kitchen table. The range is finished in baked enamel to prevent corroding. The exhibit was in charge of Charles G. Gilbert and Harold Kimball.

William M. Crane Company.—This exhibit consisted of three standard Vulcan gas ranges in charge of Charles F. Timm and H. M. Christmas.

Lindsay Light Company.—Lindsay guaranteed lights and mantles were shown in this exhibit. J. H. Kremer was in charge.

Helme and McIlhenny.—This exhibit consisted of a 5-light, a 10-light and a 25-light meter, opened to show the construction.

Thomas Roberts, Stevenson Company.—Two short cabinet, glass door, enameled equipment Fortune ranges were shown. In the cabinet grand range the broiler is 6 inches higher than ordinary so that the housewife need not bend over while using it.

General Gas Light Company.—The Humphrey gas iron with insulated hose bracket was shown, in addition to the standard Humphrey arcs, semi-indirect and combination fixtures. The No. 10 outdoor lamp, mercury valves, and the Daylight arc were also shown. The exhibit was in charge of George H. Vroom, Harold Humphrey and J. P. Conroy.

Lovekin Company.—The Lovekin automatic combination boiler and gas water heater was shown in charge of W. D. Peck, sales manager, and H. G. Peck, assistant sales manager.

Reznor Manufacturing Company.—Three of the most popular Renzor reflector heaters were shown in this exhibit. One finished in unpolished aluminum was especially attractive. Charles Harbison was in charge.

Schaeffer and Budenberg Mfg. Co.—The line of Columbia thermometers, gauges, tachometers, indicators, calorimeters and minor specialties of a like nature were shown.

Strause Gas Iron Co.—Two of the latest Iwantu tailors' irons and two Iwantu Comfort irons for household use were shown in this exhibit. J. H. Howard and Louis Strause were in charge.

Gas Appliance Corporation.—The automatic control distance lighter and timer, to save gas and time in the operation of water heaters, was the new item in this exhibit. It can be put over the kitchen sink or lavatory and when pointer is turned to the number of minutes (on the dial) burning desired, and gas turned on and lighted, and water heated operates for this length of time and is then automatically shut off. Aluminum reflector heaters, Electric Weld automatic and non-automatic water heaters were also shown, and a bulletin board showing photographs of installations. Ray Ammerman was in charge.

N. C. G. A., New York.—Specimen pages from the N. C. G. A. educational courses were exhibited on revolving bulletin boards. As the courses had been referred to in the sessions the exhibit attracted considerable attention. Louis Stotz explained details to inquirers.

Abram Cox Stove Co.—The Duplex Novelty combination coal and gas range and the Junior Yearound Novelty gas and coal range were featured in this exhibit. The latter has a horizontal boiler, gas water heater and connections and is equipped with an inverted Welsbach light. The exhibit was in charge of E. E. Pennewell, secretary of the company, and E. Post.

Ruud Mfg. Co.—This exhibit, made by Bartlett & Co., distributors for Philadelphia, showed two aluminum cottage water heaters, one suspended from a spring scales which registered only 42 pounds, and the other connected with a flue. The No. 35 tank heater was shown equipped with electric lights to illustrate the operation of the valves. The No. 4 automatic heater and No. 30 storage system were also shown. J. Crawford Bartlett, C. Edwin Bartlett and Duncan A. Worrell were in attendance.

The Benefits of Education.

[Prepared for the Annual Meeting, New Jersey State Gas Association, by H. THURSTON OWENS.]

The benefits of education are both individual and collective. The student receives in proportion to what he gives, but the collective benefits are measured by the human fellowship and mutual intercourse that is brought from nascence to incandescence. Nascence will be understood and appreciated by those of the open flame era, and they are the ones to whom pleas for educational activities are addressed.

The work of the Commercial Association is largely given over to the aid and encouragement of Company Section Meetings, and these efforts have not received the attention they deserve. During all the years that have been marked by success in educational co-operation and advertising, Company Meetings have been neglected. The Committees devoted to this work have worked vigorously but the reports indicate little progress. It has been suggested that the Association employ a travelling representative, but this idea has been dropped because of the apathy of the men they desire to reach, and not through lack of funds.

The New Jersey State Gas Association is unique in the freedom of its discussions, and this would be a propitious time for the appliance salesman to aid the industry by telling what good a direct representative could do in the dark places where the gasoline man is in evidence; where the gas offlce is poorly lighted, the "showroom" a joke, and the manager always very, very busy.

While all of us are sobered by the conflict ranging abroad, the great movements that are ordaining the envoirments of the next generation are being pushed with all the vigor of commercial propaganda. Prohibition and suffrage are the leaders, followed by the less blatant but more effective education. All three are of economic importance and have the approval of business leaders. All three aim to achieve higher standards in business and civic life. Directly associated with at least two of these is the health movement exemplified by the Boy Scout and Camp Fire Girl.

One great benefit of education is the immediate application of introspection. A monthly mental inventory of our abilities and our short comings enables us to direct our energies with greater effectiveness.

The educational plan of the N. C. G. A., while not called such, is what is known as vocational schooling. This is being applied in all the great industries, and the next generation will be in a position to obtain in our public schools the instruction we are getting by correspondence. New York city is paying an expert $1,000 a week to install one form of vocational education in its public

school system. In Germany this idea has proven its value, and in Wisconsin it has been one of the features of advanced thought. Vocational education is compulsory in some departments of the Consolidated Gas Company and the New York Edison Company.

All work and no play makes Jack a Crank. When a man devotes such a large part of his time to business or study that no time is left for rational recreation, he soon becomes a crank. Ball teams in the summer and basket ball teams in the winter should be included in our Educational work, just as it is in that of our schools and colleges.

Hygiene is a prominent feature in education, just aa it is in prohibition. Good health means good work, good manners and good fellowship. Weekly or monthly meetings bring out these qualities, and whether great mental feats are accomplished or not, the factors that pave the way for Courtesy are brought out in such gatherings. The importance of Courtesy is understood by the executives of our Public Utility Corporations, and it is well carried out by the salesmen, collectors and fitters. There is evidence of a lack of appreciation by the men in between the executive and the man on the street, the kind who take themselves too "damn" seriously.

The New York Edison Company, which has made a conspicuous success of its Educational work, lays special stress on Courtesy and has had one of its lectures reprinted. As evidence that they practice it, is the fact that in response to my request for a few copies for use at this meeting, fifty copies came in the next mail. These copies are in your hands and I want to leave you with the thought that Courtesy is one of the greatest benefits of education.

Explosives From Tar.

[From an article in the "Gas World," London.]

The explosives which to-day add to the horrors and destruction of war are derived from substances that to the lay mind are of the most commonplace and harmless. Cotton, glycerine and vasoline, under proper treatment, yield our smokeless powder that serves to drive the 2,000-pound projectile from the big 15-inch naval guns, and the bullet from the rifle, whilst the high explosives used as a bursting charge in shells, in the torpedo head and the aviator's bomb are largely derived from coal tar. Phenol, or carbolic acid, obtained from the middle oil fraction distilled from coal tar, yields on nitration picric acid, the basis of the English "Lyddite," the French "Melinite," and the Japanese "Shimose powder;" whilse an explosive attracting even greater attention in the present war is obtained in the same way by nitration from toluene, found in the crude benzol obtained by distillation from tar, and in larger quantities in the benzol obtained by scrubbing coal gas or coke oven gas with heavy oil.

To make picric acid the coal tar is distilled and the fraction coming over between 150° and 230° C. is allowed to stand, when naphthalene crystallizes out. The residual liquid is then agitated with a solution of caustic soda, which combines with the carbolic acid, forming sodium phenolate, and the latter, separating as a layer at the bottom of the vessel, is drawn off and treated with sulphuric acid to again set free the carbolic acid. The mixture is then subjected to fractional distillation, when the phenol distils over between 180° and 190° C., and crystallizes from the distillate in needle-shaped crystals. When pure, the phenol, or carbolic acid, fuses at 42° C. and boils at 182° C., and its composition, C_6H_5HO, shows it to be a hydrate of benzene.

The phenal is next mixed with an equal weight of concentrated sulphuric acid, and the mixture heated in an iron vessel by steam coils to a little over 100° C. After cooling, the mixture is dissolved in twice its weight of water, and the solution is added gradually to three times its weight of nitric acid, specific gravity 1.4. The acid is contained in earthernware pots standing in running water to prevent undue rise in temperature, and when fuming has ceased, steam heat is applied to complete nitration. On cooling down, crystals of picric acid separate, and, after washing with warm water, are purified by re-crystallization.

This method of making picric acid is called the sulphonating process, and is now the one almost entirely employed. It may be regarded as a nitro-substitution product, in which three atoms of the hydrogen in the original phenol are replaced by the radical NO_2.

It is now nearly 50 years since Designolle first suggested a mixture of potassium picrate and saltpetre as a bursting charge for shells. In 1873 Dr. Sprengel showed that the picric acid by itself was capable of being detonated by mercuric fulminate, and in 1885 Turpin patented the use of picric acid for shells and torpedoes, and proposed to make it less sensitive to percussion by melting it and pouring hot into the shells; or by making the grains into a solid mass by means of collodion. In this way a large weight of the explosive can be got into a small space.

The great drawback to picric acid is its acid nature, which causes it to act on metals, with formation of picrates, some of these like lead picrate, being far more sensitive to friction and percussion than the acid itself. Turpin's idea of casting the picric acid into a solid mass by means of collodion had very soon to be abandoned, as it was found that it had sufficiently strong acid properties to develop a dangerous acid reaction in the mass. One has to be very careful, for the same reason, in mixing with it oxidizing material which is capable of being acted upon.

Turpin's explosive was named by the French, Melinite, and its introduction caused a great sensation throughout military circles. Extensive experiments were instituted by Sir Frederick Abel, at Woolwich, and the explosive, slightly modified, was introduced into the English service under the name Lyddite.

The lyddite shells used in the South African campaign showed great diversity of behavior, at one time exploding with tremendous effect, and at others giving a very low order of explosion and dense yellowish green fumes. This was due to the fact that for its proper explosion picric acid needs a powerful detonator, and fear of premature explosion of the shell in the gun prevented sufficiently strong detonators being used. Later on the Japanese, who used picric acid under the name of Shimose powder, rendered the bursting charges highly effective by the use of a detonator of a different character, but paid the penalty of the sensitive nature of the explosive by several cases of explosion of the shell in the gun.

For a successful bursting charge there are several factors more important than the power of the explosive itself, and first amongst these is that it be sufficiently insensitive to prevent any chance of its being exploded when a store of it is struck by a shell, as the case in an ammunition wagon in the field; nor must there be any fear of premature explosion in handling it or firing it from a gun. The fact of picric acid under certain conditions having these drawbacks has led to attempts to replace it by some other bursting charge of the same character free from the drawbacks found in picric acid, and trinitrotoluol (T.N.T.) has been found to have advantages of an important character, being chemically more stable, free from acid reaction and without action on metals. It is, therefore, unable to accidentally form more sensitive compounds, and although its explosive force is slightly less than picric acid, which exercises a pressure when detonated of 135,820 pounds on the square inch, while trinitrotoluol gives a pressure of only 119,000 pounds per square inch, yet this is not altogether a drawback, as when used as a bursting charge the shell is not shattered into such small fragments, and will often, therefore, give more destructive effects.

The crude 50% benzol, as obtained by distillation from the coal tar, is found to contain a mixture of aromatic hydrocarbons, so called on account of their pleasant smell, which approximates roughly to

Benzene	50%
Toluene	36%
Xylene	11%
Other compounds	3%

and from these by careful fractional distillation the toluene can be separated, the boiling points and specific gravities of the three substances being:

	Specific Gravity	Boiling Point.
Benzene	0.886	80.5
Toluene	0.869	110.0
Xylene	about .0.87	137—140

These same aromatic hydrocarbons are present in benzol from coke oven gas, and in a good illuminating gas their vapors form the chief illuminants.

These aromatic hydrocarbons are produced by the action of heat on the primary constituents of the products of decomposition obtained by heating coal—that is to say, if coal be distilled at the lowest possible temperature it is found that the primary products of the decomposition contain saturated hydrocarbons of the character of paraffins, and the aromatic hydrocarbons are practically absent. As the temperature used rises, benzene soon makes its appearance. When in the horizontal retort using light charges distillation was carried on at a temperature of ab ut 1,000° C., the gas, on passing through the red hot coke, and being subjected to radiant heat from the crown of the retort, gave the highest percentages of

(*Continued on page 282.*)

THE AMERICAN GAS LIGHT JOURNAL

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SANFORD K. CAMPBELL, Editor.

NEW YORK, MONDAY, MAY 3, 1915.

Mid-Year Conference, National Commercial Gas Association.

The Mid-Year Conference held last year by the N. C. G. A. was so successful that it has been decided to hold another in New York City on June 10th and 11th, 1915.

The morning of Thursday, June 10th, will be given over to Committee meetings at 61 Broadway, and all committee members are requested to attend. The purpose of these meetings is to enable the chairmen of the various committees to receive suggestions from the members and plan their work for the year. In the afternoon, the first regular session of the Conference will be held in the Auditorium of the Consolidated Gas Company, 130 East 15th street.

The program includes an address by some prominent man in the industry, and there will be three sessions—Thursday afternoon, Friday morning and Friday afternoon.

The Conference will aim to cover the following topics and sessions:

General topic: *Dealers vs. Gas Companies as Selling Agencies for Gas Appliances.* The main questions to consider will be "how gas companies can best co-operate with the dealers and department stores, and whether it is advisable for the gas company to discontinue the sale of appliances and turn the business over to the dealers."

It is intended to have some prominent department store head, present a merchandising talk.

There will be an educational session, in charge of Dr. Lee Galloway, Chairman of the Board of Educational Control and Director of the Association's educational activities. Members and company executives will be able to learn of the increasing tendency of large interests to take up the question of educating employees. The very successful work of the Association along these lines and a full discussion of the new course, will have a part in this session.

A Publicity and Advertising Session, in charge of Mr. Thomas R. Elcock, Jr., Chairman National Advertising Committee, will be most instructive and interesting, as the committee will be prepared to bring up for discussion some new and unique publicity plans.

These Mid-Year Conferences are an opportunity for the man not always able to attend the Annual Convention to secure the same benefits, though possibly in a lesser degree. It is by close association with one another, and by such interchange of ideas and experiences that we broaden our sphere of usefulness. Every member who can possibly attend should do so. Those who are not members are invited to come, get acquainted and see what the Association is doing.

It is hoped that companies will adopt a liberal attitude and encourage their men to attend this meeting. It will keep up interest and will renew in a stronger and more lasting manner the spirit of co-operation that is one of the big factors in the making of every successful business.

Keep the dates in mind and arrange to attend. New York, June 10th and 11th.

Maryland Standard Set at 600 B. T. U.

The Maryland Public Service Commission has adopted an order setting forth rules for the regulation of the gas companies of that State in general and the Consolidated Gas, Electric Light and Power Company of Baltimore in particular.

A heating value of 600 B. T. U. is made the standard; and as this is less than heretofore furnished in Baltimore, they rule that unless the company voluntarily reduces its rate when the new standard becomes effective, to wit, 5 cents net per 1,000 cubic feet, the commission will not permit a single standard of heating value to become effective in Baltimore, but will adopt the double standard of quality of gas, the same as furnished heretofore by the company, to be maintained by it at its present rate, until the commission can investigate the rate.

The order of the commission requires the company to state within 5 days what it will do, and says that failure to give notice to the contrary will be construed as an acceptance of the terms of the order. There is, however, no legal requirement that the company shall accept the order at once, as the law gives 60 days within which an appeal to the courts can be taken.

In discussing the reason for a heating value standard the chairman said the testimony shows that in Baltimore City and in Maryland generally it is estimated that from 90% to 94% of the total consumption of gas is for heating purposes, and only 6% to 10% used in flat-flame burners for illuminating purposes.

That standard should be selected that will enable the consumer to get the greatest value for the price paid, and that will insure to the benefit of the great majority of users.

"Where artificial gas is required to be of sufficient heating value the illuminating power thereof will ordinarily be found to be ample to meet the needs of those who will retain the open-flame burners. Unfortunately, however, there is no established ratio between the heating and illuminating power of gas. The evidence before the Commission shows that the maintenance of two standards would greatly increase the difficulty of operation, and to require the same might increase the cost of production beyond all degree of possible benefit.

"We, therefore, have determined upon a single standard, which standard shall recognize and be predicated upon the heating or calorific value of the product exclusively, as best meeting the conditions in Maryland. We are now confronted with the question of the measure of that standard. The scientific standard is the one that will be conductive to the greatest efficiency; efficiency of production and distribution on the part of the company; efficiency in use upon the part of the customer; as expressed by the Bureau of Standards, the delivery of the most heat to the consumer for the dollar. What is this standard expressed in British thermal units?

"The gas being supplied at the present time by the Consolidated Gas, Electric Light and Power Company of Baltimore has a heating value not far from 600 B. T. U. Owing to the meager testing facilities in use by the other companies throughout the State, it is impossible to determine with any degree of accuracy the quality of the gas now being furnished by such companies, but from such tests as are available the calorific valve is believed to be approximately 600 B. T. U.

"We find that where other State commissions have established standards to govern the calorific value of gas, the standard is in each case not far from 600 B. T. U.

"The whole evidence in the case shows the range to be from 570 B. T. U. to 625 B. T. U. As the gas supplied at present in Maryland is approximately 600 B. T. U., with fair satisfaction to the consumes, and as the weight of the evidence conclusively shows that around 600 B. T. U. is to be found the scientific standard, we have determined to adopt 600 B. T. U. as the value of the heating standard for the State of Maryland. This, however. should not be done in the case of the Consolidated Gas, Electric Light and Power Company of Baltimore without an adjustment of the rate."

No Let-Up in Advertising: A Good Example.

At the last meeting of the General Committee of the British Commercial Gas Association the Executive Committee presented a report covering the period since the general meeting held in October last. The following are some extracts from the report:

The decision, approved by the general meeting, to proceed with the full publicity campaign during the current year, so as to assist the industry as far as possible to maintain its business during the crisis with which the nation is faced, has received the practical support of the industry in a measure exceeding all expectation. Not only have the subscribing undertakings, with but few exceptions, renewed their contributions on the same basis as in former years, but some that previously had subscribed on a partial basis have this year given the full 2s. 6d. per million—notably Leicester, where last year's subscription of £150 has been followed this year by £285—while the number of new subscribers reported is, under all the circumstances, most gratifying.

It has thus been shown conclusively that the great bulk of the administrators of undertakings which represent 80 per cent. of the industry realize fully the importance of maintaining the national publicity campaign during a period of exceptional difficulty, and believe that, whatever economies have to be effected, expenditure on development should be maintained, and, if anything, increased.

There is, therefore, every reason to anticipate that the outcome for the current financial year will be at least as great as during the previous year, and to hope that it will be considerably greater.

This circumstance, highly satisfactory as it is, does not do away with the unsatisfactory fact that there are still so many undertakings benefiting by the expenditure of their neighbors without contributing anything to the common fund. Much has been done by correspondence to bring the case for universal membership before all non-subscribing undertakings, and results are steadily accruing from this campaign and from the efforts of individual members. It has, however, been suggested that more could be done by organized personal effort in the various districts, and the executive recommend steps be taken in that direction by the formation of membership committees in the districts, etc.

Charles Dudley Lamson.

The Society of Gas Lighting has passed this resolution:

It is the sad duty of the Society of Gas Lighting to record the passing away on February 12th, 1915, of Charles Dudley Lamson, of Worcester, Mass., a member of the Society since May 4th, 1876.

As our number is small, so is the loss great when one is lost from our midst. But what words can express our tribute to one whom we have known well and favorably for nearly forty years; one who has sat in our councils and joined in our feasts, has aided with his wisdom, cheered with his genial fellowship and touched us with the warmth of his friendship?

The record of his professional work stands spread before us in our own and other gas association proceedings, and in the technical press. One of his papers, entitled "A Pound of Coal," read before this Society September 9th, 1909, marked an epoch in the history of coal gas production. It recorded and analyzed the working of a new plant unlike anything in previous use, enunciated new principles of operation and showed results in yield of gas and candle power never before approached in practical and long continued working. The effect of this paper was widespread. Not only in the United States, but in England and elsewhere, were certain of its new principles adopted with profit In fact, is is not too much to say that this work by Mr. Lamson set new and higher working standards for the whole gas industry.

With our fellows in the profession we deprecate this loss to the industry; but it is as personal friends with a deep sense of personal loss that we offer his family our heartfelt sympathy.

For the Society of Gas Lighting,

J. Arnold Norcross,
C. J. R. Humphreys,
B. W. Perkins,
Committee.

[Official Notices.]

Natural Gas Association of America

Secretary's Office,
Delaware, O., April 1st, 1915.

The Tenth Annual Meeting of the Natural Gas Association of America will be held in Cincinnati, O., May 18, 19 and 20, 1915.

The President, Mr. James T. Lynn, of Detroit, Mich., will call the meeting to order on Tuesday, May 18th, at 10 A.M., in the Assembly Room of Music Hall, Elm Street, opposite Washington Park.

There will be one session each day, starting promptly at 10 A.M. until 3 P.M., with a 30 minute intermission for lunch. Therefore, punctuality is necessary; there will be no waiting.

The Mayor of Cincinnati, Hon. Frederick S. Spiegel, will welcome the Association.

Judge S. M. Douglass, of Mansfield, O., will respond to the address of welcome on behalf of the Association.

The following papers will be presented at the meeting:

"Equitable Rates for Natural Gas," by Mr. Donald McDonald, Louisville, Ky.

"Public Service Commissions," by Mr. James W. McMahon, Toledo, O.

"The Future of the Natural Gas Industry in America," by Mr. J. C. McDowell, Pittsburgh, Pa.

"Economical Construction and Operation of a Natural Gas Plant," by Mr. George W. Barnes, Los Angeles, Cal.

"The Use of Natural Gas at Domestic Rates for Industrial Purposes," by Mr. R. W. Burr, Columbus, O.

"Thirty Cent Natural Gas Melts Brass for Half the Cost of Coke."

"Gas House-Heating—Its Cost and Application." by Mr. F. R. Hutchinson, Cleveland, O.

There will be an elaborate and especially interesting exhibit of gas equipment in connection with the meeting under the auspices of the auxiliary association—The Association of Natural Gas Supply Men.

Every member of the Association who can possibly attend should make a special effort to do so; and gas companies are particularly urged to send as many men as can be spared, as the meeting will have a most stimulating influence on those in attendance.

T. C. Jones, Secretary.

Iowa District Gas Association.

Des Moines, Ia., March 22, 1915.

The Eleventh Annual Meeting of the Iowa District Gas Association will be held in Clinton, Iowa, May 26, 27, and 28.

The headquarters of the Association will be at the Lafayette Inn. Members are urgently requested to make early reservations. Mr. Thos. Crawford, General Manager, Clinton Gas and Electric Company, is Chairman of the Committee of Arrangements, and will furnish any information desired. Reservations may be made by communicating with the Lafayette Inn.

The following papers will be presented at the meeting:

"How can we Most Profitably Supercede Oil, Coal and Coke with Artificial Gas as Fuel in Industrial Plants?" by E. L. Lambert.

"Industrial Appliances," by W. L. Powers.

"Iceless Refrigeration," by Malcolm F. Ewen.

"Commissions and Financing of Gas Properties," by Andrew Cooke.

A symposium of short papers on:

"How to Spend Money to Make Money in the Gas Business," by H. C. Blackwell, H. B. Maynard, G. W. Clabaugh, G. I. Vincent, E. I. Lambert and W. H. Taylor.

The attention of the members of the Association is called particularly to the list of papers, which embody the most vital subjects before our industry to-day.

In addition, the following Standing Committees will report: Tar, Manufacturing, Distribution, Construction, New Business and Public Relations.

There will be a smoker and Dutch lunch on Wednesday night, a trip to Eagle Point Park, and an open air picnic meeting on Thursday, and a boat trip on the Mississippi river on Friday.

T. B. Genay, Secretary.

(*Continued from page 279.*)

Explosives from Tar.

these bodies in the gas, and in 1883 experiments made by Mr. G. E. Davis showed that 1,500 cubic feet of Manchester gas, when washed through creosote oil, yielded

Benzene	1,500 c.c.
Toluene	625 "
Xylene	245 "

The gas made per ton of coal at that period was about 10,000 cubic feet.

With the gradual increase in temperature which has taken place since those days, and the increase in gas yield from 10,000 to 13,000 cubic feet per ton, the extra heat to which the products have been exposed have reduced these quantities to small proportions, although the gas made in small country works where the temperature is not excessive, still contains them in considerable quantities.

The formation of the aromatic hydrocarbons may be explained by the fact that the action of heat on the paraffins in the primary products of the distillation splits them up into simpler saturated hydrocarbons and naphthenes, whilst the naphthenes, on exposure to further heating, split off hydrogen and are converted into aromatic hydrocarbons.

If a paraffin hydrocarbon, like dodecane, $C_{12}H_{26}$, be heated under pressure to a temperature just short of decomposition a rearrangement of the groups of atoms takes place to form simpler molecules, as shown by Thorpe and Young, and under these conditions the dodecane might be converted into hexane and hexylene—

$$C_{12}H_{26} = C_6H_{12} + C_6H_{14}.$$

Under lower pressures, and in contact with carbon at a low red heat, the open chain olefine becomes converted into a body identical in composition, but belonging to the closed carbon ring series of naphthenes, so that instead of hexylene it forms hexahydrobenzene.

These naphthenes are identical in composition with the olefines. Both hexylene and hexahydrobenzene would be represented by the empirical formula C_6H_{12}, but when their reactions and decompositions are studied they are found to be totally different; hence the olefine and naphthene series are said to be isomeric.

When one attempts to brominate a naphthene, instead of forming additive compounds it will form only a substitution body; hence hydrobromic acid is formed, whilst sulphuric acid of a strength that would dissolve an olefine has little or no action on the corresponding naphthene.

The great difference, however, between olefines and their isomers the naphthenes is the decomposition they undergo when further heated. Whilst the olefines split up into simpler members of the same series, then into acetylene and methane, and finally into carbon and hydrogen, the naphthenes shed off the extra hydrogen atoms and are converted into aromatic hydrocarbons such as benzol, toluol, xylol, etc.

In the tar made by carbonizing coal at 450° C. naphthenes are found in abundance, but only small traces of aromatic hydrocarbons, but when the temperature of carbonization has risen to 900° C. the naphthenes have disappeared and the aromatic hydrocarbons are found in their place, whilst as the temperatures are forced higher and higher the percentage present in both gas and tar gradually falls. The three aromatic hydrocarbons that go to form crude benzol leave the retort as vapors, and the amount found in the tar has been dissolved out of the gas in the hydraulic main by the heavier vapors whilst condensing, the larger proportion still remaining in the gas and giving a large proportion of its illuminating power, and also adding to its calorific value.

In the present high temperature carbonizing processes, the yield of crude benzol from the tar produced by a ton of coal is only about 0.2 gallon, but by scrubbing the gas with heavy oil and distillation this might be brought up to 2.5 to 3 gallons per ton, from which about 25% could be separated as toluene, and it is suggested that in order to increase the supply of toluene for making trinitrotoluene, the gas made in the large gas works should be stripped in this way, which, of course, would so reduce its illuminating and heating value as to bring it below the Parliamentary standard. To meet this objection, it is suggested that the stripped gas should be carburetted with the benzene from which the toluene has been separated, and, if necessary, brought up to the required standard by carburetted water gas or other enriching material.

The large gas works, however, owing to the high temperatures employed in carbonization, do not offer nearly so promising a field for the recovery of the toluene by such a process as the smaller works, where the temperatures used are lower; and a simple form of combined scrubber, distilling apparatus and carburetter fitted for use with small makes would probably be far more successful in dealing with the problem. In coke oven practice, where the crude benzol is recovered from the gas, 3 to 3.5 gallons are obtained per ton of coal. Although only about half the coal coked is treated in recovery plants, the yield of benzol is about 16,000,000 gallons per annum, so that, now export has been stopped by the war, very large supplies of toluene should be available.

Toluene to be used for the manufacture of trinitrotoluene should be a clear water-white liquid, free from any suspended solid matter and having a specific gravity of not less than 0.868 or more than 0.870 at 15.5° C. Its boiling point must approximate closely to 110° C., and 80 c.c. shaken with 10 c.c of 90% sulphuric acid for five minutes should give only a slight color in the acid layer after settling. The prescribed distillation test is as follows:

100 c.c. are placed in a fractionating flask of 200 c.c. capacity. A thermometer divided in tenths of a degree C. is so adjusted that the top of the bulb is on a level with the side tube. Heat is applied over a small area of the centre of the bottom, and the distillation conducted in such a way that the distillate passes over as quickly as possible in distinct drops, but not in a continuous stream. The temperature is read when 5 c.c. and again when 95 c.c. have collected in the receiving cylinder. The difference between the two readings must not be greater than 0.8° C.

The preparation of trinitrotoluene is carried out in three distinct stages, the toluene being first converted to the mononitro compound, which is then further treated with nitric acid at a slightly increased temperature to convert it into the trinitrotoluene, this being finally nitrated in sulphuric acid solution with strong nitric acid to trinitrotoluene.

On a large scale, trinitrotoluene is manufactured commercially from the orthonitrotoluene by a sulphonating process of the same character as that used in the manufacture of picric acid, and the crude crystals obtained in the final nitration are purified by solution in alcohol, filtration and re-crystallization, the crystals being freed from alcohol in a centrifugal machine and air-dried.

Trinitrotoluene, when pure, has no odor and is a yellowish crystalline powder, which darkens slightly on keeping, and has a melting point of 81.5° C.; the presence in it, however, of isomers, lowers its melting point to 79° C. It is perfectly stable, and is unaffected by contact with metals, forming no compounds with them even in the presence of moisture. It cannot be exploded by flame or strong percussion, and a rifle bullet may be fired through it without any effect on the mass. When heated to 180° C. it ignites, and burns with a heavy black smoke; but when detonated by a mercuric fulminate detonator, the explosion is of great violence, and gives the heavy black smoke which has been such a characteristic of high explosive shells used in the present war. Even when detonated under water a column of black smoke is thrown up above the surface of the water.

An interesting point with such explosives as picric acid and trinitrotoluene is the tremendous concussive effect which their detonation produces, and which often causes death within a certain radius of the explosion by heart shock, and in many cases where death was not caused it has been found that serious displacement of the heart has occurred. The formation of so much black smoke from the explosion of trinitrotoluene shows that very incomplete combustion is taking place. A mixture of trinitrotoluene with ammonium nitrate and small quantities of aluminum powder forms a very effective explosive, largely used under the name of "Ammonal;" the great drawback, however, is the hygroscopic character of the ammonium nitrate, which necessitates the material being put up in airtight cartridges. It forms, however, a most effective bursting charge, and although the rate of detonation of the trinitrotoluene is reduced by the admixture of the oxidizing compounds the shattering effect is even more destructive than when the explosive is used alone, as the pieces of shell scattered are larger in size.

Under the influence of nitration other constituents of tar are converted into effective explosives, dinitrobenzol being the basis of such mining explosives as "Roburite" and "Bellite," whilst triintrocresol is used largely in place of picric acid, under the name "Ecrasite," but it shares with picric acid the drawback of forming more sensitive compounds with bases, and having an acid reaction.

Industrial Rate Based on Maximum Demand.

The Consolidated Gas, Electric Light and Power Company of Baltimore, Md., put in effect the following schedule of rates for industrial gas as of April 1st.

SCHEDULE K.—INDUSTRIAL GAS RATES, GENERAL SERVICE.

Gas for industrial uses in specified location will be sold under this schedule to any customer who has signed an agreement for permanent gas service for a term of at least 3 years, embodying the terms and conditions of the company. No maintenance or supplies of any kind will be furnished by the company under this schedule. Agreements will continue in force for repeating periods of 1 year each, unless terminated by the customer or the company by 30 days' written notice before the termination of the original term or the termination of any year thereafter.

FIXED COSTS.

A price of $204.00 per year, payable in monthly installments of $17.00, will be charged for the first 300 cubic feet of demand or fraction thereof.

Reduction.—A price of $48.00 per year per 100 cubic feet of demand, payable in equal monthly installments of $4.00, will be charged for that part of the demand that is in excess of 300 cu. ft.

These prices are to cover the company's fixed investment and operating charges in establishing service and standing ready to serve, and do not include the supply of gas.

RUNNING COSTS.

A price of 70 cents gross per 1,000 cubic feet (60 cents net, when bills are paid on or before the last discount day) will be charged for all gas supplied under this schedule, up to and including 20,000 cubic feet per month.

First Reduction.—A price of 45 cents gross per 1,000 cubic feet (35 cents net) will be charged for all gas supplied under this schedule exceeding 20,000 cubic feet per month and up to and including 1,000,000 cubic feet per month.

Second Reduction.—A price of 40 cents gross per 1,000 cubic feet (30 cents net) will be charged for all gas supplied under this schedule exceeding 1,000,000 cubic feet per month.

Prompt Payment Discount.—The net prices above specified result from and depend upon a discount of 10 cents per 1,000 cubic feet from the specified gross prices given only for payment of bills within ten days from the date of the reading of the meter.

Demand.—The demand is the maximum rate of use and is defined as the greatest number of cubic feet used in any one hour, and shall be specified in the contract. The specified demand shall be subject to revision by actual measurement of the customer's maximum hour's use by suitable instruments furnished by the company. The demand having been thus established shall not be substantially decreased during the term of the contract, but shall be increased in accordance with and for all billing after any increase in maximum use which may from time to time occur. Upon extraordinary occasions for a certain limited period, the company may, at its option, give permission to exceed the determined maximum rate of use by a stated amount without increasing the established demand upon which charges are based.

Non-Peak Service.—For installations in which the use of gas is considerably less between the hours of 5 P.M. and 7 P.M., during the period from October 1st to the succeeding March 1st, in each year, than at other times, the specified demand or the demand upon which the rate is based may be taken as the measured rate of use occuring during any hour between the said hours in the said winter months, provided, that the demand shall in no event be taken as less than one-half ($\frac{1}{2}$) of the maximum measured rate of use at any other time, the use under such conditions being classified as "non-peak."

Meters.—Not over two (2) meters will be furnished by the Company at its expense at any one contract location under the Schedule, unless installed for the Company's convenience. Additional meters will be furnished at a rental of $2.50 per month each, for meters on which demands are determined and a rental of $1 per month each for sub-meters. All meters referred to herein are of the standard type and sizes of gas meter and recording meter heretofore in general use; should the conditions in any instance call for different standards, the Company shall have the right to revise its Fixed Costs and its meter charges specified herein accordingly.

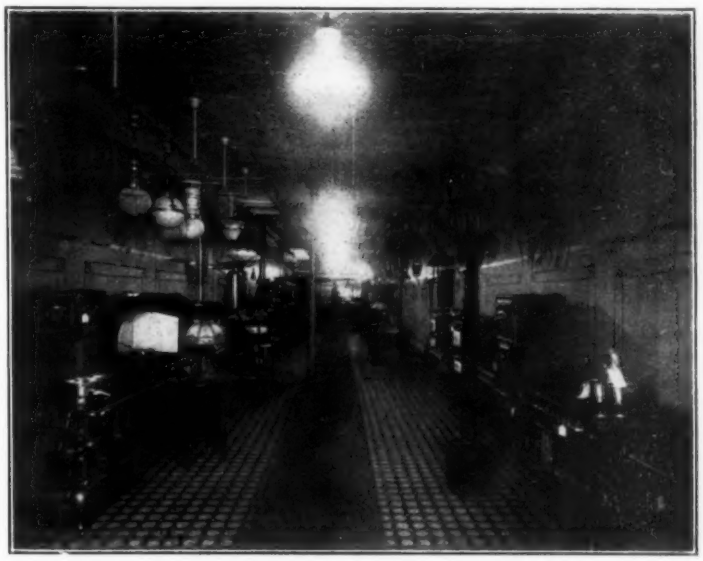
Collective Application.—This Schedule will apply to one contract location only. Where one person, firm or corporation is engaged in commercial or industrial business at more than one location, one contract may be made under this Schedule for the supply of gas to the said several contract locations for a term of not less than five (5) years, under the following conditions:

The Fixed Charges for each location shall be based solely and individually upon the separate demands of said locations; and the Running Costs for all locations shall be based upon the aggregate gas consumption at all locations covered by the contract. One bill shall be rendered monthly, based upon the meter readings taken at approximately monthly intervals on such days each month as the Company may elect.

Change of Rate.—In case the Schedule upon which any contract is based should be modified to give any consumer a lower rate for like service under like conditions during the period of said contract, the customer using service under said contract shall be given full advantage of such modification from the date of putting such modification into effect for any service.

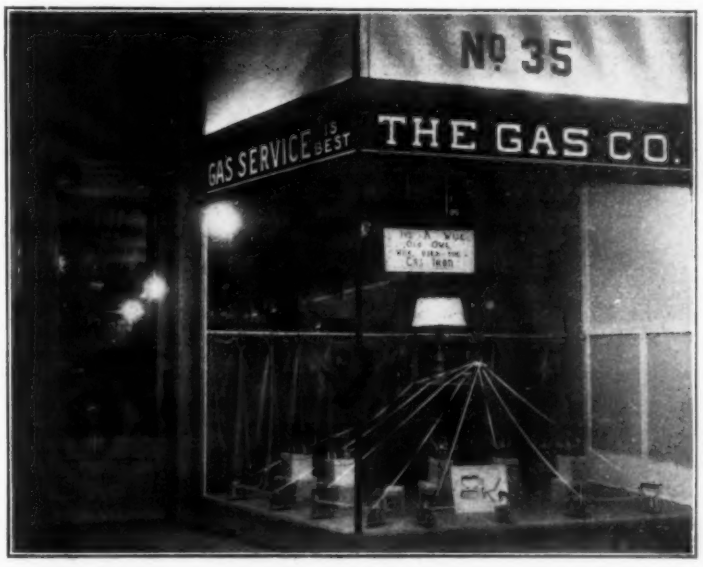
Hazleton Displays.

The Luzerne County Gas and Electric Company in Hazleton, Pa., has arranged its office so that customers paying their bills go past everything displayed. For convenience in showing, all house fixtures are hung in one section of the room, domes and showers in opposite section across the room, Humphrey arcs and semi-indirect fixtures in another section. The idea is that if one salesman is showing one kind of fixtures and another showing a different class of fixtures, they will not interfere with each other.



View of Showroom

They display portable lamps on substantial oak tables, and have open oak cases for aluminum ware and hot plates. By using cases with draw shelves they are able to show six or seven hot plates in the space usually occupied by one.



Gas Iron Window Display.

In another section is a bracket board fifteen feet long displaying upright and inverted lamps and brackets, and two shelves of the same length displaying the various designs of glassware.

In the centre of the room is a full Ruud Water Heater display, showing automatic circulating water heaters; and two upholstered chairs and table on a rug in front of the fireplace for the convenience of the customers who wish to use it as a rest room.

The color scheme of the room is carried out in light colors, panelled off in tasteful designs.

The illumination of the office was No. 20 Welsbach lamps, but has been changed to semi-indirect units.

The show window is lighted by 12 No. 6 Reflex lamps, above a deck of metal and ripple glass panels. They have had great success with this window, the illumination being as near perfect as could be wished.

Power Plant Oil Filter.

Although it has been on the market only a short time, the Peterson Power Plant Oil Filter has made a remarkable record, in that filters of this type totaling over 1,500,000 gallons fiiltering capacity are now in operation. The reason this filter has been adopted on most of the important lubricating systems installed during the past year, is due to the fact that it embodies new and efficient principles of oil purification, and has 600% greater filtering capacity in the same space.

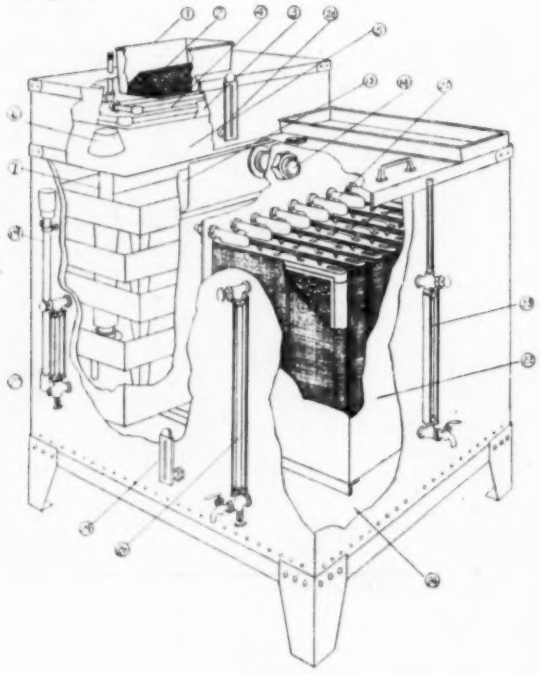


Fig. 1.

The following detailed description of the operation of the filter shows why it purifies oil so efficiently:

The dirty oil enters the filter through a strainer box (1), passing down through a removable strainer (2), where large particles of foreign matter, such as waste, etc., are strained out. The oil then passes to the heating tray (3), where its viscosity is reduced. It then flows to compartment (5) and down through funnel (6). The further operation of the precipitation compartment is more clearly shown in Fig. 2. Passing down through conductor (6) the oil is spread out by baffle (8) under the bottom of tray (9). Under the action of the head that builds up in conductor (7), the oil takes a zig-sag path upward, passsing under and over trays (9), (10), (11) and (12), as shown by the lines of flow. It then passes out through opening (14) to the filtering compartment. The separated water collects in the bottom of the trays and is by-passed directly to the bottom of the precipitation compartment by funnels (15), (16), (17) and (18) without coming in contact with the traveling oil, and is automatically ejected by a water overflow tube (19) which consists of two concentric pipes. The water flows upward through the outer tube and spills over the top of funnel (20) into waste pipe (21). The funnel (20) is threaded and can be raised or lowered, providing adjustment for oils of different specific gravity.

Referring again to Fig. 1; the level of the oil in the top tray is maintained constant by the skimmer (13), and flows by pipe (14)

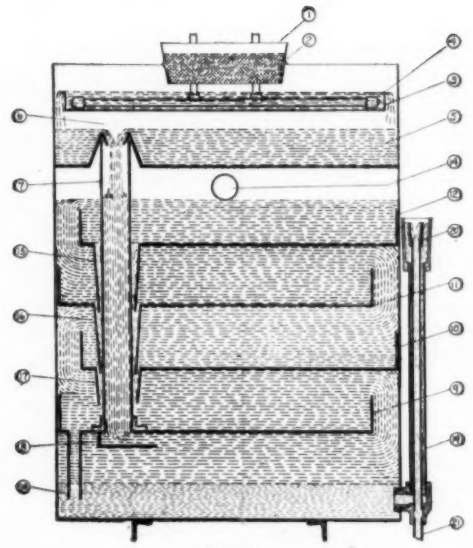


Fig. 2.

into the filtering compartment (22), which contains 9 filtering units (shown in Fig. 3). The oil passes from the outside to the inside of the filtering units, then out through the nozzles (25), which project through the wall at the filtering compartment, to the clean oil compartment. The nozzle on the filtering units fits into a spring actuated valve, so that any unit can be withdrawn and cleaned without interfering with the continuous operation of the filter.

Fig. 3.

The filtering cloth is so arranged that it is free from folds or plaits, rendering every square inch active in filtering. Whenever filtering cloth is wadded up or in folds the cloth in some places presents a single thickness and others triple thickness in the oil circuit, and the oil follows the path of least resistance, and practically all of it will pass through the single thickness and a large percentage of the filtering medium will be ineffective.

In the Peterson filter, no oil can pass to the clean oil compartment until the level in the filtering compartment (22) reaches the outlets (25); thus no filtering takes places until every square inch of cloth is submerged in oil. Then as soon as a slight head builds up over the outlet, the filtration commences and is distributed over all of the surface, every square inch of which is subjected to equal pressure.

The head of oil over the filtering discs is shown by the indicator at the top of guage (23), which, when the filter is operated at normal rating should show about 3 inches. If a greater height is indicated it shows that the oil is not passing through the cloth as fast as it should and therefore the cloths need cleaning. The filters are rated at 3″ head over the filtering discs, but space is provided for carrying a 6″ head. Thus the filter is capable of handling

short overloads of 100% so that in case a large batch of oil is run in, the filter will take care of it.

There is a decided advantage in having the filtering cloth vertical and the oil passing from the outside to the inside of the units, because the slime and sediment which collects on the cloth works toward the bottom and drops off, automatically tending to keep the surface clean. When cloth is arranged horizontally the sediment forms a cake over the cloth, greatly slowing up the filtration and necessitating using several times as much filtering surface. The Peterson filtering medium is a special grade of cloth which does not act as a screen, but filters the oil largely by capillary action.

The capacity of a filter for purifying oil from steam engines or steam turbines is not limited by the filtering material, but really by its capacity for removing entrained water, and the only way to effectively remove water is by bringing the oil to rest in large tanks or spread in thin sheets flowing at a low velocity so that the water will settle out by gravity as is done in the Peterson filter.

Gauge (27) shows the water level in the precipitation compartment, which should be carried as low as practical. Gauge (26) shows the clean oil level. The cock on the fitting at the bottom of this gauge provides for withdrawal of clean oil from the filter. Gauge (23) shows the level of the oil in the filtering department, which should at all times be full of oil. Thermometer (28) shows the temperature of the oil entering the precipitation compartment, enabling the engineer to adjust the heat supplied, so that the proper viscosity will be maintained. Thermometer (29) shows the temperature in the clean oil storage compartment.

The filter body is of No 12 galvanized sheet steel reinforced with channel and angle iron. All joints are lapped and closely riveted and soldered.

The only parts needing periodical cleaning are the filter cloths. Filtering units can be removed without interfering with the operation of the filter, and should be lifted out and set in a pan of kerosene or gasoline and brushed down with a stiff brush. Occasionally the cloths can be removed and washed.

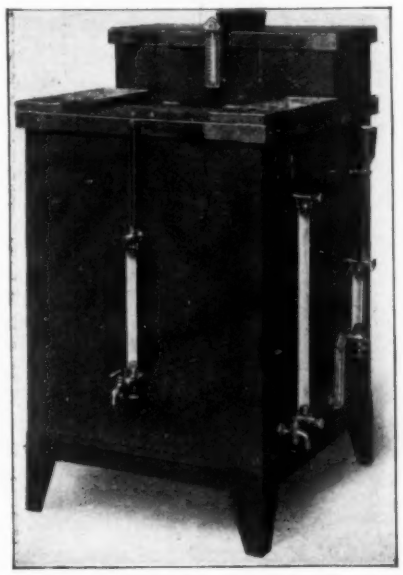


Fig. 4.

The Peterson filter is built on the unit principle. Fig. 4 shows the number 5 size having a capacity of 100 to 200 gallons per hour, and units having a capacity of 7,500 gallons per hour have been built.

Tests made at Cornell University show that when a Peterson filter is used, lubricating oil can be used over and over again indefinitely.

Comparative Values of Increasing Vacuum and Steam Pressure.

An engine operating with steam at 150-lb. gage and a condenser vacuum of 24 in. of mercury can transform into mechanical energy only 23.7% of the heat in the steam. If the vacuum is increased to 28 in., the percentage of heat converted is 28.8%. If the vacuum is kept at 24 in., and the steam pressure raised to 200-lb. gage, the percentage of heat converted into mechanical energy will increase from 23.7% to 25.3% This shows that increasing the vacuum is effective than increasing the steam pressure, but combinations more of both will have still more desirable effects.

New Methods and Appliances.

ARC LAMP, SEMI-INDIRECT CONVERTER.—An important development in lighting accessories is announced by Bayley & Sons, manufacturers of Equalite lighting products. They have perfected a set of Equalite shades for use with standard types of Welsbach and Humphrey Arc Lamps that convert them into semi-indirect units.

The Equalite 20 is fitted with shade ring to fit Welsbach 20, 42, 48 or 58. and the Humphrey 10 lamps, in place of reflector shades or globes.

No. 10 Humphrey in Converter.

Converters are also made for Humphrey 30 and 50, and upright, and for Welsbach Intenso 3 and 4 mantle. The effect produced is very pleasing; the ceilings are well lighted, the glare from the lamp removed and the illumination is very soft and well diffused.

In designing the converters the following points were considered essential: Low price, easily attached, proper light distribution, small absorption of light, strong but light in weight, easily cleaned, of good mechanical design and good appearance.

The largest field for these shades will be among store keepers who desire up-to-date lighting with a small outlay. When gas companies own arc lamps they will make them saleable or make those now installed stick.

When campaigning the 10, 20, 42, 48 or 58 lamp, the No. 20 shade can be offered as an alternative, as no troubles from breakage due to heat will be experienced with the adapter.

The price at which they can be sold makes possible a very rapid extension of semi-indirect lighting.

THE POURING OF BABBITT METALS.—In a treatise on the pouring of babbitt metals the following advice is given: "Better service will be obtained if you will learn that it is of utmost importance to pour babbitt metals at low temperature." This is explained by the fact that a metal poured at high heat will be brittle and open-grained. The cast liner will be tougher and denser in proportion to the reduction in heat. Another good suggestion offered is: "When practical, take the chill off the mandrel and shell by warming, as this will dry off the moisture which causes blowholes, and also make the metal flow better."

On the subject of remelting metals, it says: "Instructions are generally given to stir before pouring. Those who give such instructions intelligently do so because the tendency is to pour metals too hot and the stirring lowers the heat." This dispels the idea, which many engineers have, that the purpose of stirring is to reunite the separated alloy. To determine whether the melted metal needs cleaning, it is advisable that the surface of the metal be examined while it is at a fair pouring heat. If fine spider-web lines appear on the surface after skimming, the metal is clean; if the tell-tale lines are not there, the metal requires a Turkish bath.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

IN an article on "Men Who Have Helped te Make Public Utilities Servants of the Public," the New York "Evening Post" places the name of Henry L. Doherty with Thomas A. Edison, Theodore N. Vaile, president of the American Telephone Company; Wilbur C. Fish, president of the Hudson & Manhattan Railroad Company; Alexander C. Humphreys, president of the Stevens Institute, and Samuel Insull, president of the Commonwealth Edison Company. The article says of Mr. Doherty:

"The majority of men whose names are bywords in the public utilities field began life poor. They entered the industry when it also was poor, and have grown rich with it.

"Henry L. Doherty, senior member of the banking firm bearing his name, president of the Doherty Operating Company and head of twenty-four gas, electric light and power companies, having a combined capitalization of $60,000,000, began life very far down the ladder. He had to sell papers when 9 years old, and on the death of his father had to see to the support of his mother and two sisters. That was when he was 12. Now, at the age of 45, located on top of the ladder he looks down and regrets not a single rung climbed."

CHARLES HENRY DUNBAR died April 21 at the McLean Sanatorium, Waverly, Mass., where he was recently taken for treatment. Mr. Dunbar was born at Pittsfield, Mass., June 11, 1869. He was educated in the local schools, and being desirous of a technical education, later entered the Worcester Polytechnic Institute, from which he was graduated in 1891 with the degree of Mechanical Engineer, and from Cornell University at Ithaca, N. Y., in 1894, receiving the degree of Electrical Engineer. In 1895 he accepted a position with the American Gas Company as General Manager of the Elgin (Ill.) Gas Light Company. After 10 years in Elgin he accepted the position as General Manager of the Houston (Tex.) Gas Company, which prospered greatly under his supervision, and in 1912 the company was sold to the United Gas and Electric Corporation of New York City. Soon after Mr. Dunbar suffered a nervous breakdown, and has since been under the care of Chicago specialists. Later he returned East, feeling that the change might prove beneficial. Mr. Dunbar is survived by his mother, Mrs. Anna Dunbar of Pittsfield, Mass., two brothers, George C. Dunbar, superintendent of the Westfield Power Company, of Westfield, Mass., and Albert Dunbar, purchasing agent of the Boston Consolidated Gas Company, and one sister, Mrs. E. E. Dutton, of Lowell, Mass.

A LENGTHY discussion took place at a recent meeting of the New England N. E. L. A. Section relative to the wisdom of a company's paying its employees' dues in organizations like the company section of the N. E. L. A. The general opinion was that such a policy should not be maintained over a year by any company with respect to any individual employee, and some speakers favored paying half the dues for the first year and then leaving the matter to the employee. The point was made that unless a privilege costs something it is apt to be unappreciated. Other speakers held that the payment of the initiation fee on the instalment plan has worked out well among lowered salaried workers.

THE Iowa Senate has passed the bill to permit public utility comporations to issue bonds to the extent of twice the paid up capital stock. This measure is intended to permit the Des Moines Gas Company to finance improvements in its plant which will cost between $500,000 and $1,000,000, according to reports. The Iowa law limiting utilities to issuing bonds to two-thirds of the capital stock has worked to a disadvantage, the corporations organizing in other States where the laws are more liberal.

AN interesting evening was spent by the Brooklyn Engineers' Club as guests of the Brooklyn (N. Y) Union Gas Company. The industrial laboratory of the company is fitted up with every known gas appliance and some interesting experiments were tried by the engineers and their friends. A chop suey stove was one of the appliances shown and an exhibition in the proper way to cook on this stove was demonstrated. The heat treating of metals under the direction of A. C. Davis was very interesting to the visitors. C. E. Chapple gave some very interesting demonstrations with the oxy-illuminating gas torch. He showed how autogenous welding could be done and lead burning and steel cutting. The last experiment was upon a Bethlehem steel girder a foot in width and a half inch in thickness. A section of the 12-inch girder was cut in about 12 minutes. Exhibitions also were given on the automatic gas fired water storage system, and the automatic gas fired steam boiler and its application to the factory heating.

MR. THOMAS C. MCKENZIE, JR., formerly of New York city, who for the past several months has been in charge of the sales' department at the office of the Winston-Salem (N.C.) Gas Co., has been promoted to chief of the commercial department to succeed Joe. B. Smith, who recently resigned that position to enter business for himself in Atlanta. Mr. McKenzie for several years prior to coming to Winston-Salem was with the Henry L. Doherty Co., of New York city, and is well qualified for the new position and promotion with which he has just been honored.

THE proposition made by the Alton Gas & Electric Co., to the city of Alton, Ills,, for the transfer of the Piasa Light & Power Co. franchise to the Alton Gas & Electric Co. has been withdrawn. This involves the withdrawal of the proposition that the company pay the city of Alton 2% on its monthly revenues from all sources except for power.

THE bill to fix arbitrarily the price of gas in Boston at 70 cents, beginning July 1 of next year, was killed by an overwhelming vote in the Massachusetts House after a long debate. The House refused to pass it to be engrossed by a rising vote of 92 opposed to 35 in favor. An attempt to secure a roll call on the measure failed. Thirty votes are necessary to secure a roll call in the House, but only 24 could be mustered on the gas bill. The main feature of the debate on the bill came when Speaker Cox relinquished his gavel, and for the first time this session, took the floor. He vigorously opposed the measure as breach of faith against and virtual repeal of the so-called sliding scale agreement under which the price of gas in Boston is decreased as the dividends of the Boston Consolidated Gas Company increase.

E. D. V. DICKEY, manager of the Freeport (Ill.) Gas Company, entertained the Freeport Gas Employees' Association and visiting guests at the Freeport Club last week. When the dinner had been disposed of and cigars passed, Mr. Dickey, after a few brief remarks, turned the meeting over to the president of the association, Mr. Price, who gave the response thanking Mr. Dickey for his hospitality and his interest in the Association. The president, acting as toastmaster, introduced the following gentlemen, guests at the meeting: Harry H. Stahl, mayor-elect; W. L. Calkins, president of Chamber of Commerce; H. Poffenberger, P. M., editor of Bulletin; R. B. Simpson, secretary of Chamber of Commerce. The following papers were read by members of the association: "The Public and the Gas Company," L. J. Sinclair. "Educating the Employees and the Gas Company," George Young.

THE Washington County Gas Company, Johnson City, Tenn., has been incorporated with $200,000 capital stock to build a plant in that city and lay 22 miles of mains, installing a high pressure gas system. It plans to extend its lines to Jonesboro and Elizabethton, and work on the plant will be started at once.

LONG delay by the Longmeadow (Mass.) Selectmen in acting on a petition of the Springfield Gas Light Company for permission to run a high-pressure gas main from Springfield to the State line, has resulted in the company abandoning attempts to lay the main through the town, and it now has petitioned the Selectmen of Agawam for permission to supply that town with gas service and to lay a main through Agawam to the Suffield line. There the main will connect with one of the Northern Connecticut Light and Power Company, which supplies gas to patrons in Suffield, Thompsonville, Windsor Locks and nearby places. The change in the Springfield company's plans means that the town of Agawam will have gas service, for which it has long wished, and the Connecticut company will get its gas from Springfield instead of Hartford, thus greatly increasing the output of gas from the Springfield plant and improving the service in the Connecticut towns that are affected.

THE Omaha (Neb.) Gas Co. has remitted to the city $6,686.45 occupation taxes for last year, the payment being made under protest, as the company has done for several years.

THE annual meeting of the Chuctanunda Gas Light Company was held in the offices of the company in Amsterdam, N. Y. Clar-

ence D. Stewart was chosen a member of the Board of Directors to succeed the late John Vedder Morris. The following officers were elected: Chairman, John Sanford; President, John K. Stewart; Vice-President, W. H. Cooper; Secretary, D. D. Cassidy; Treasurer, F. S. Van Derveer. Superintendent, George D. Conlee; Cashier, George W. West.

NEARLY 100 ladies attended the first cooking demonstration on the gas range at the Portland Gas Light Company's building, Portland, Me., an unusually large attendance for the first day. Keen interest was manifested in the lecture and practical cooking demonstration by Miss Carolyn P. Webber. Miss Webber is a recognized authority in Boston as a cooking teacher, and has the ability to make her demonstrations attractive and extremely interesting as well as instructive.

J. E. ALDRED, chairman of the Board of Directors of the Consolidated Gas, Electric Light and Power Company, Baltimore, Md., and the Pennsylvania Water and Power Company, was elected a member of the board of the United Railways and Electric Company, of which he has recently become a prominent stockholder.

THE Milwaukee (Wis.) Bond Men's Club met recently in the University Club to listen to an address by R. B. Brown, of the Milwaukee Gas Light Company, who spoke on the gas business and gas securities.

THE big gas mains of the Chattanooga By-Product Coke Company are being laid into Chattanooga as rapidly as men can do the work and material can be delivered. A large force of workmen is engaged at a point between the city and Alton Park, near Wade's curve, just at the corporation limits of St. Elmo, putting the mains into the ground, and pipe is distributed along the route for several blocks. The mains have been laid across the fill leading to the North St. Elmo school house, directly into Alton Park, the location of the plant.

AT the annual meeting of the stockholders of the Joseph Dixon Crucible Company, on April 19th, a large attendance of stockholders expressed their satisfaction with the present management and re-elected the Board of Directors for the ensuing year. The vote recorded was the largest ever represented at an annual election—19,519 shares out of 20,000. The following are the Directors elected: George T. Smith, Robert E. Jennings, George E. Long, E. L. Young, William G. Bumsted, J. H. Schermerhorn, Harry Dailey. The officers elected by the Board are: President, George T. Smith; Vice-President, George E. Long; Treasurer, J. H. Schermerhorn; Secretary, Harry Dailey; Asst. Secy. & Asst. Treas., Albert Norris.

PRESIDENT DANA D. BARNUM of the Worcester (Mass.) Gas Light Company has requested the chairman of the city committee on ordinances, that they take up the matter of drafting an ordinance regulating the installation of gas pipe in Worcester, and also to provide for an inspection of all new pipe laid. Under the present law, he says the Worcester Gas Light Company has no authority, and consequently no responsibility for pipe installed beyond furnishing gas as requested by consumers. President Barnum favors an ordinance that will provide an inspection as to the size of pipe installed and the manner of installing.

AT a meeting of the Cleveland (Tenn.) city council the 40-year gas franchise ordinance, asked by C. F. De Frese, of Chattanooga, passed the third and final reading. The franchise provides for a rate of $1.40 per 1,000 cubic feet. The plant, which it is estimated will cost $65,000 is to be completed within 18 months.

THE Grand Haven (Mich.) Gas Company is extending a pipe line to the Spring Lake Boat Works to furnish gas for the operation of a large Fairbanks-Morse gas engine for driving the machinery of that growing plant.

NOTICE has been served on the consumers of gas in Sea Isle City, N. J., by the Sea Shore Gas Company, that they have made application to the New Jersey Public Utilities Commission for permission to raise the rate for gas from $1.25 per 1,000 cubic feet to $1.75. This action on the part of the gas company has resulted in a vigorous protest from the private consumers, many of whom are Philadelphians who own or rent summer homes.

UTILITIES COMMISSION NEWS.

PENNSYLVANIA COMMISSION NOMINATIONS RECALLED.—Governor Brumbaugh notified the Pennsylvania Senate on April 15 that he had recalled the recess nominations of the present seven members of the Public Service Commission made by his predecessor. His letter was brief, stating simply that his predecessor nominated on Jan. 5, 1915, by the advice and consent of the Senate, the members of the commission. After stating the names of the members and the terms for which they were appointed, Governor Brumbaugh said that he recalled the nominations.

TO FOLLOW UP COMPLAINTS.—The Public Service Commission for the First District, New York, has directed its secretary to notify all public service corporations that failure upon their part to respond promptly to letters from the secretary in regard to informal complaints will be deemed sufficient reason for the institution of formal proceedings requiring the attendance of the officers of the companies at the commission's office.

On motion of Commissioner William Hayward the commission has appointed a special committee to look into all service orders previously adopted and to report whether any are obsolete or unworkable. Commissioner Hayward stated that in his opinion it would be better for the commission to have ten good orders which could be enforced than a hundred about which there is any doubt. Chairman McCall appointed Commissioners Hayward and Williams as the committee.

MUST SHOW NECESSITY.—An amendment to the law in Washington has been adopted, providing that proposed utilities, both municipal and private, must obtain certificates of public convenience and necessity from the commission before the commencement of business. This certificate may be granted only after public hearings.

MAY CHARGE MORE BY PREPAYMENT METER.—On a petition brought by the Western United Gas and Electric Company, Aurora, Ills., the Illinois Commission has ruled that the company may charge a higher rate for gas where a prepayment meter is in use than where ordinary meters are used. It is not permissable, however, to charge consumers who are in arrears a higher rate than other consumers of the same class. Last December the Commission decided that the company could not charge prepayment meter patrons $1 and other patrons 90 cents per 1,000 cubic feet. Now it reverses the ruling, as the company showed that it costs more to take care of prepayment patrons and that the prepayment meters are installed at the request of the consumers.

NEW NEW YORK COMMISSIONER.—James O. Carr of Schenectady, General Manager of the General Electric Company, has been nominated by Governor Whitman to succeed Martin S. Decker as a member of the up-State Public Service Commission. Commissioner Decker, whose term expired on February 1, was the only member of the present boards who received his appointment from Governor Hughes. Mr. Carr's nomination was sent to the Senate Finance Committee and there is no doubt of his confirmation.

WILL NOT ALLOW BOND INCREASE.—The Board of Public Utility Commissioners of New Jersey has refused approval for a proposed issue of $40,000 of bonds by the Ocean County Gas Company, holding that the property of the compary does not justify the increase in bonds.

MAY CHARGE FOR METER INSTALLATION BUT NOT FOR SERVICE.—The up-state New York Public Service Commission has decided that a gas company cannot charge a customer for tapping the main and for the curb box and curb cock between the main and the customer's service pipe. According to the decision of the commission these items are capital charges for property which remains with the company and not with the customer.

Complaint was made by Julius J. Eyring against the North Buffalo Natural Gas and Fuel Company as to the charges mentioned, which amounted to $4.48. A number of hearings were held in Buffalo before Commissioner Hodson, at which the complainant and the company were represented, and which attracted much interest from other property owners. The Commission's decision not only returns this charge to Mr. Eyring, but orders the company to desist making this charge in similar cases. The Commission decided that an item in the company's bill against Mr. Eyring for $2.12 for the installation of meter and connections in the complainant's house is a just and equitable one.

Financial Notes.

THE SAN ANTONIO (Tex.) GAS AND ELECTRIC COMPANY and the SAN ANTONIO TRACTION COMPANY have been relieved of an indebtedness of $1,800,000, incurred by recent improvements instituted by both corporations. The indebtedness was paid off by leading stockholders of the company, who took in return additional shares of stock in the companies. Of the amount, the Traction company expended $1,100,000 and the Gas and Electric company $700,000, in improvements which embrace new car tracks, extensive paving, and extension of gas mains to various outlying districts. The new capitalization of the Traction company is $2,500,000 and of the Gas and Electric company, $2,200,000.

A QUARTERLY dividend of $3 per share has been declared on the capital stock of the FALL RIVER GAS WORKS COMPANY, payable May 1, 1915, to stockholders of record at the close of business April 17, 1915.

AT the annual meeting of the stockholders of the PACIFIC GAS AND ELECTRIC COMPANY on April 14, President Frank G. Drum said that no announcement with regard to a common-stock dividend would be made by the board until May 1. The outgoing directors were re-elected with one exception, Mr. J. A. McCandless taking the place vacated by the resignation of Mr. J. E. Gladstone of New York. Earnings for the first 3 months of 1915 compare:

	1915.	1914.
Gross	$4,749,327	$4,342,676
Net	2,529,916	2,202,977
Surplus after charges	1,425,685	1,094,888

The company on April 14 had $3,600,000 cash on hand.

IN discussing operations for the year ended Dec. 31, 1914, President D. D. Curran, NEW ORLEANS (La.) RAILWAY AND LIGHT COMPANY, stated that the increase in net income was very gratifying, particularly because operating expenses in the gas department had increased approximately $60,000, gas rates were reduced on April 1, electric rates were reduced on Dec. 1, and there was a fare reduction on the West End and Spanish Fort railway line. The statement for 1913 and 1914 follows:

Operating revenue:	1914	1913
Railway department	$4,398,507	$4,401,152
Electrical department	1,427,295	1,335,186
Gas department	1,186,322	1,158,094
Total	$7,012,124	$6,894,432
*Operating expenses:		
Railway department	$2,341,420	$2,439,154
Electric department	561,227	555,308
Gas department	526,224	425,107
Total	$3,428,871	$3,419,569
*Net operating revenue	$3,583,253	$3,474,863
Net revenue outside operations	8,012	11,791
*Total net revenue	$3,591,265	$3,486,654
Revenue deductions:		
Taxes	$761,223	$724,535
Uncollectable consumers' accounts	9,000	6,661
Total	$770,223	$731,196
*Net operating income	$2,821,042	$2,755,458
Miscellaneous income	45,551	34,763
*Gross income	$2,866,593	$2,790,221
Income deductions:		
Interest on funded debt	$1,709,451	$1,630,731
Other interest charges	15,627	52,181
Dividends on stocks of lessor company owned by others	4,084	4,107
Taxes on non-operating land and improvements	17,345	16,559
Amortization of funded debt discount and expense		23,375
Other income deductions	7,341	4,926
Total	$1,753,848	$1,731,879
Net income before deducting charges for renewals and replacements	$1,112,745	$1,058,342
Charges for renewals and replacements	189,618	180,813
Net corporate income	$923,127	$877,529
Less dividends on stocks of subsidiary companies held by others	4,013	4,770
Balance of net income carried to surplus	$919,114	$872.759

*Not including charges for renewals and replacements shown separately.

CONTENTS.

AN ASTERISK (*) DENOTES AN ILLUSTRATED ARTICLE.

*PRESIDENT DUTTON'S ADDRESS TO THE PENNSYLVANIA GAS ASSOCIATION ... 273
*THE IMMEDIATE GAS ENGINE BUSINESS, by H. W. Edmund ... 275
THE PENNSYLVANIA SHOW ... 278
THE BENEFITS OF EDUCATION, by H. Thurston Owens ... 278
EXPLOSIVES FROM TAR ... 279
EDITORIALS ... 280
Mid-Year Conference, National Commercial Gas Association—Maryland Standard Set at 600 B. T. U.—No Let-Up in Advertising: A Good Example—Charles Dudley Lamson.
OFFICIAL NOTICES—
Natural Gas Association of America ... 281
Iowa District Gas Association ... 281
INDUSTRIAL RATE BASED ON MAXIMUM DEMAND ... 283
*HAZLETON DISPLAYS ... 283
*POWER PLANT OIL FILTER ... 284
COMPARATIVE VALUES OF INCREASING VACUUM AND STEAM PRESSURE ... 285
NEW METHODS AND APPLIANCES ... 285
*Arc Lamp, Semi-Indirect Converter—The Pouring of Babbitt Metals.
ITEMS OF INTEREST FROM VARIOUS LOCALITIES ... 286
Mr. Doherty Has Served the Public—Charles Henry Dunbar Dead—Should Companies Pay the Dues?—Relief for Iowa Companies—Brooklyn Engineers Entertained—Mr. McKenzie Promoted—Alton Company Withdraws It's Offer—Boston Seventy Cent Bill Defeated—Freeport Gas Employees Association Entertained—Johnson City, Tenn., Company Ready—Selects Another Route—Omaha Paid Under Protest—Amsterdam, N. Y., Elections—Portland Cooking Demonstrations—Mr. Aldred on Another Board—Mr. Brown to Bond Men—Chattanooga Line Building—Dixon Company Officers—Wants Piping Standards—Cleveland, Tenn., Franchise Granted—Grand Haven Engine Load—New Company to Raise Rate.
UTILITIES COMMISSION NEWS ... 287
Pennsylvania Commission Nominations Recalled—To Follow Up Complaints—Must Show Necessity—May Charge More by Prepayment Meter—New New York Commissioner—Will Not Allow Bond Increase—May Charge for Meter Installation but Not for Service.
Financial Notes ... 288
Public Lighting Table for May, 1915 (Ad. Section) ... 7
Meeting Times of the Various Gas Associations (Advertising Section) ... 21